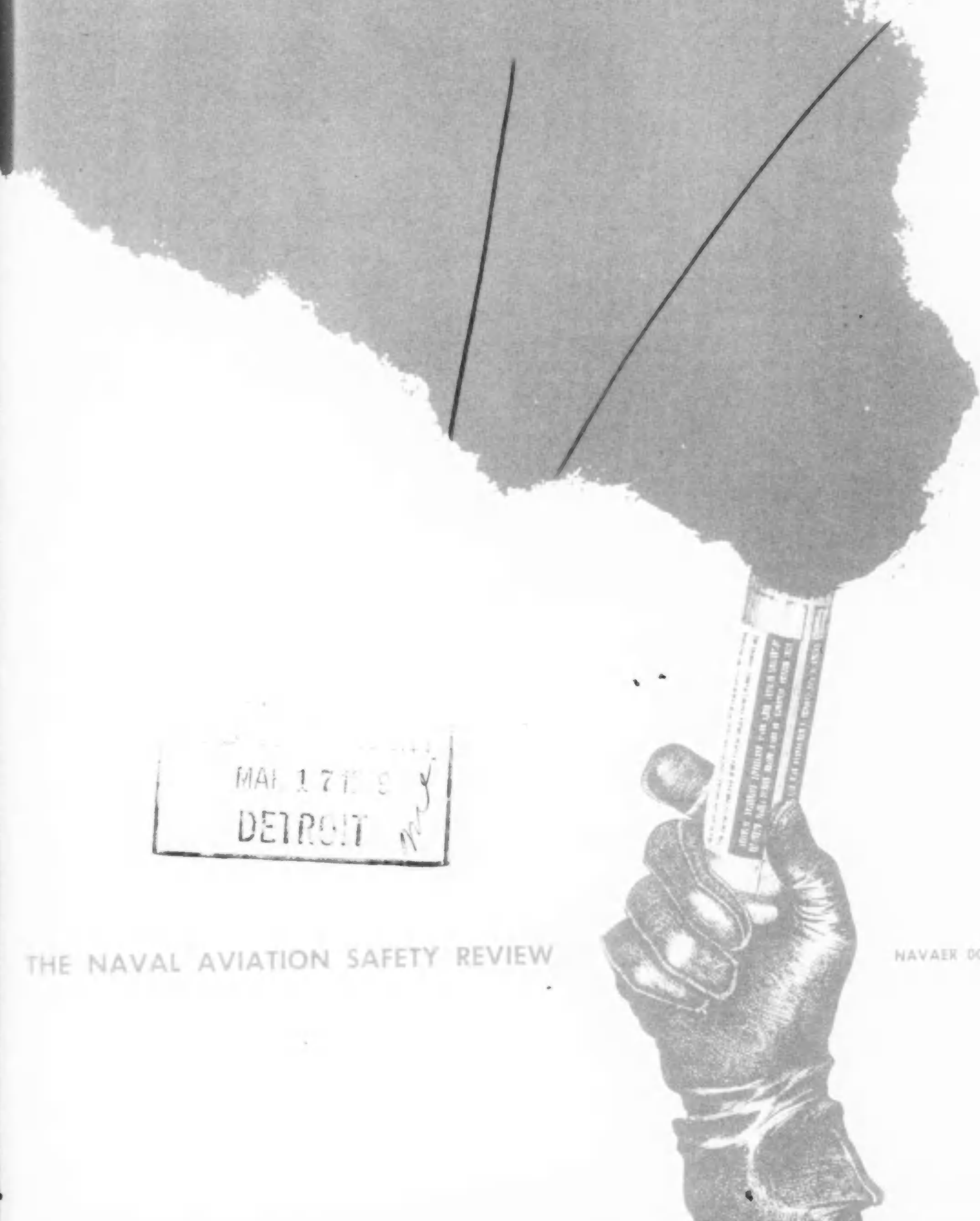
approach

March 1959



THE NAVAL AVIATION SAFETY REVIEW

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ON THE COVER . . . your Mark 13 day flare sends off billowing clouds of brilliant, orange smoke — visible for miles and miles. Let's hope that you have a sound plan for survival; the aviators in this month's survival yarn didn't (see page 32). All survival efforts are in vain if you are not found, which brings up this month's feature on search techniques, page 3.

approach

MARCH 1959

VOLUME 4
NUMBER 9

Purposes and Policies: APPROACH is published monthly and contains the most accurate information currently available on the subject of aviation accident prevention. Contents should not be construed as regulations, orders, or directives. Material extracted from Aircraft Accident Reports, (OpNav 3750-1), Aircraft FLIGA Report (3750-10), Medical Officer's Reports (OpNav 3750-8) and Anymouse (anonymous) Reports may not be construed as incriminating under Art. 31, UCMJ. Photos: Official Navy or as credited.

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Letters

Due Credit

Sir:

"Man to Man" in the December issue of APPROACH gives the credit line to the "3RD MAW Wingtips."

To give credits where credits are due, the Third MAW publishes with the minutes of the Máintenance Officers Committee a "Phase of Maintenance," every one of which has been written by MSgt Charles T. Perkins.

Your use of these articles has been especially gratifying to this Headquarters and the author. Future use of any of these articles is authorized in that each and every one of them aims toward more improved and efficient aircraft maintenance throughout the Navy.

T. H. MANN, Jr.
Lt. Col. USMC

● **APPROACH gladly extends credit due MSgt Perkins and invites readers' attention to "Case of Precedence," March '58, bylined MSgt Perkins.**

Status Board for Nav Aids

Sir:

Why not a status board in Ops at the Clearance Desk showing the status of the Nav Aids, such as OMNI, TACAN, UHF Home, . . ., —No one would take the two-finger turn-up on the cat unless he knew what the ship had turned on—Why then do we have to question the Ops Duty Officer as to what the station has working? And too many times even he isn't sure.

WESTPACMOUSE

● **Some do!**

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by the U.S. Naval Aviation Safety Center.

GCA Error

Sir:

APPROACH must be commended for the outstanding article, "Request GCA," which appeared in the January 1959 issue. As a GCA controller I was extremely delighted to read such an accurate account of the mission and operation of GCA.

However, I did detect one error on Page 10, right hand column, third paragraph in regards to ceiling minimums. The article stated it is the pilot's responsibility to level off at ceiling minimums unless the runway is in sight. From OpNav Instruction 3721.1B I quote "The controller shall advise the pilot just prior to the aircraft's arrival at the ceiling minimum whereupon the pilot is required to level off unless visual contact has been established with the GROUND," not runway. This is a commonly accepted fallacy, even among many controllers. Actually if contact has been established with the ground at ceiling minimums, the pilot can continue his approach. However, when reaching the *visibility* minimum, the pilot is required to execute a missed approach unless the runway is in sight.

Other than this clarification, I must confess it was one of the better articles I have read on GCA.

LT. MARTIN D. REICHENTHAL
Marine Air Traffic Control Unit 61

Happy Landings

Sir

During the month of October 1958, units attached to ComFAir-Hawaii pursued an all-out program to eliminate landing accidents. To inaugurate the campaign a general meeting was held with representation of all available units. Guidelines for the campaign were presented and all attendees were instructed to follow them, stressing the contents of ComNavAirPac Safety Bulletins 16-58, 17-58, 19-58 and 20-58.

It was agreed that rather than direct units to follow identical campaigns each would evaluate its own procedures and place emphasis where deemed appropriate. Some of the measures adopted are as follows:

1. Touch-and-go landings were prohibited during the month of October. Although this did not affect the operation of all units, some indicated that basic pilot check-outs were hampered due to this practice.
2. Individual commanders displayed safe landing posters throughout squadron spaces.
3. Units monitored landings by their respective pilots on a non-scheduled basis and the use of movies of landings/approaches was employed.
4. Runaway wheels watches were already employed in the Hawiian area; however, personnel standing these watches were reimpressed with the importance of their jobs.

Results attained are as follows:

1. ComFAirHawaii units flew a total of 10,257.6 hours during the month of October 1958.
2. 4721 landings were made in the Hawaiian area for this same period of October 1958.
3. **There were no landing accidents in the Hawaiian area during the month of October 1958.**

It is the consensus that the

Continued from preceding page

safety campaign was a complete success. It is strongly recommended that this type of campaign be employed for other phases of accident trouble areas such as taxi accidents, groundhandling accidents (hangar crashes), foreign object damage. . . . It is felt that although these campaigns do produce results on a local level, a Pacific Fleet-wide campaign, with a monthly tally report in the Safety Bulletin giving recognition to the accident-free units, would stimulate more of a competitive spirit and produce far greater rewards. It is intended that the program will be kept alive and effective.

R. F. HICKEY, RADM
ComFAirHawaii

There IS a Deferred Emergency

Sir:

In the "Headmouse" question and answer section on page 21 of the January 1959 issue of APPROACH there is a question relating to deferred emergencies. Your answer that the word "deferred" has no official status as being a type of emergency is incorrect. NWP 41, paragraph 273b defines a "deferred emergency" as follows: "The pilot considers that an early landing is necessary in the interest of safety, but that he can orbit the carrier for a short time while preparations are being made." Paragraph 273 also defines "immediate" and "delayed" emergencies, as well as a "lame duck."

While the definitions given in paragraph 273 of NWP 41 deal primarily with carrier operations they are not limited thereto. All Navy tower operators should be familiar with these terms since carrier aviators are not likely to use a different language as soon as they cross the coast.

As for the proper action to be taken by the tower operator, when a pilot declares an emergency of any type, there is only one safe rule. That is to treat all emergencies as emergencies. The pilot, in declaring any type of emergency, has indicated the possibility of trouble when he lands, so other traffic should not be allowed to embarrass him, and the crash crew should be called out.

R. C. STARKEY, CDR, USN
USS ONSLOW (AVP-48)

● Headmouse flamed out on this one. LCDR W. D. Blevins of VAH-6 also scored Headmouse and invited his attention to Art. 1564(b) of ATP-1 for a definition of deferred emergencies.

No Clearing Turns?

Sir:

Re "Smart and Snappy" (December 1958).

The accident which was the basis for referenced article involved a young *Cougar* pilot whose "Snappy" turn after launch cost his life.

Neither the recommendations of the accident board nor your comments include what the writer considers a positive preventive measure for this unnecessary loss, DON'T TURN!

The incident, as reported, reflects we are going to hang on to our World War II tactics even if they kill us. Present day sweptwing

combat configured aircraft with critical flight characteristics, particularly during the launch maneuver, demand the most exacting of pilot techniques. The advantages of clearing turns were outweighed by this single loss. How about taking the emphasis from clearing turns; remove the phrase from carrier pilots' vocabulary; stress the pilot finesse required in professionally executed launches and rely upon the catapult officer to insure against takeoffs into jet wash? The amount of delay insuring against the latter will total more seconds for an entire day's operations.

Let's become current!

C. E. MULLIGAN, CDR, USN
COMFAIRHAWAII

● This depends upon the wind. The delay is quite long when the wind is down the axial, and it sometimes is in spite of all the CO can do. The OTC sometimes insists upon launches downwind, crosswind, and in turns. When the OTC directs such procedures, there are times when a turn is a must. However, there has never been anything that says the pilot must turn before he has the aircraft under control. I would say that the PROFESSIONAL approach lets the pilot make the decision. And if he doesn't think it's safe, he doesn't have to turn. If he knows he can hack it, and if turning will help, he ought to turn.

There is no need to take the clearing turn out of the pilot's vocabulary. There is a need to educate pilots and possibly some of the higher echelon.

Red Book

Sir:

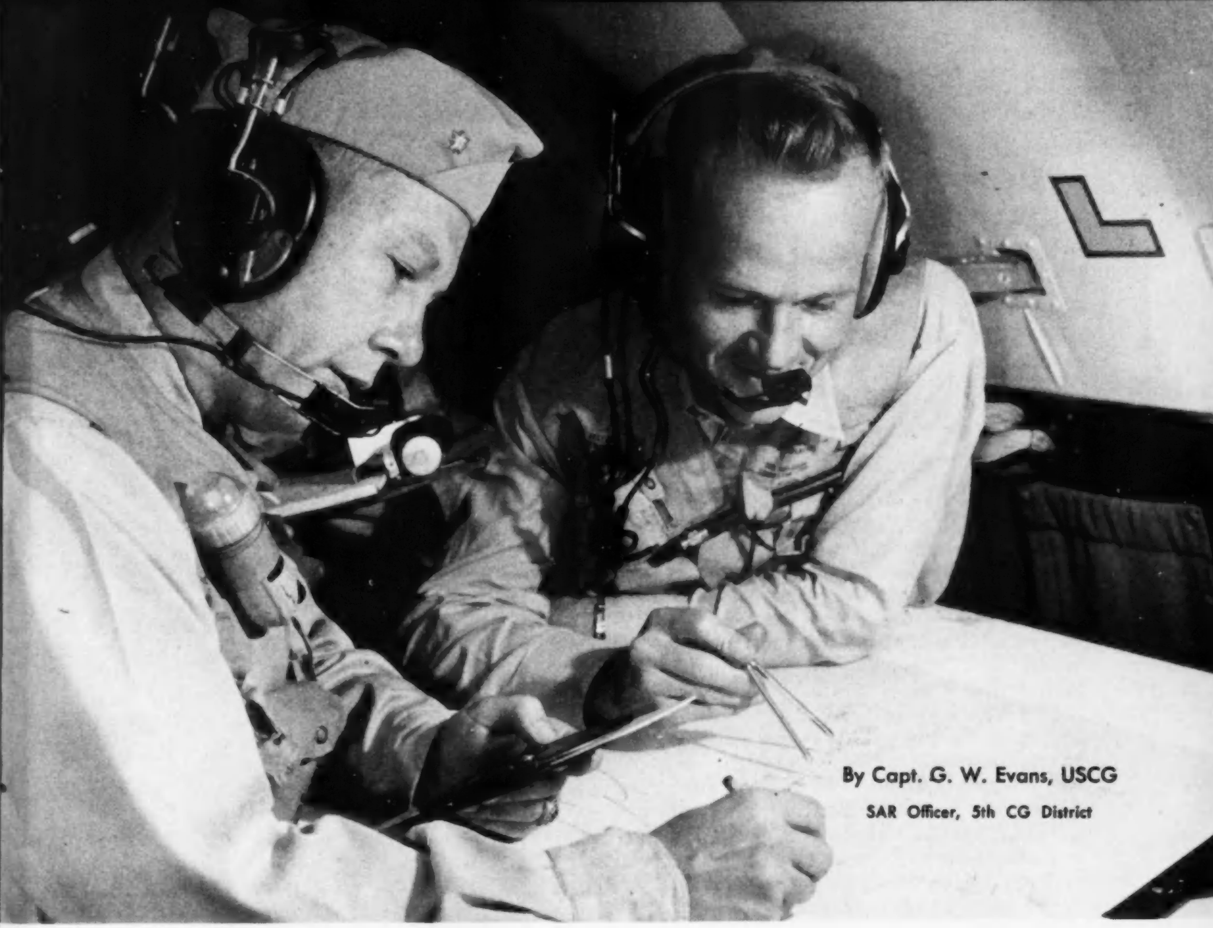
In our tower we have recently added a book which we think might one day be extremely useful. This book consists of the red pages of all pilot handbooks for the types of aircraft currently on board this station. Anyone compiling such a book is cautioned to make sure they have all the red pages for all types and modifications. An example of this is the AD-5 and the AD-5W are somewhat different.

It is felt that this could be especially helpful for single-piloted aircraft in those emergencies that do not allow time to get a pilot qualified in model up to the tower before landing or bail-out is necessary.

Our present plan for use is to offer to read through emergency procedures for the pilot and then it would of course be at the option of the pilot. Any comments on this would be sincerely appreciated.

JIMMIE D. HAYS, ACC
NAS Operations Tower
Pt. Mugu, California

● Good idea, if the limitations stated in the letter are observed and the book is correct.



By Capt. G. W. Evans, USCG
SAR Officer, 5th CG District

NO TIME FOR STUDY

You're blissfully cruising along from Here to There when you hear the Mayday! You report your presence on the scene — and several other aircraft report their presence to YOU . . . and there you are, you're the OSC, the On-Scene Commander, with search aircraft at your command and waiting for decisions. It's not long till dark either — no sir, this is No Time for Study . . . .

"YES," you say, "I know about search and rescue; and some day when I need it, I figure some guys will come on out and do their stuff, even if it's me getting rescued. I already know the main things about that subject anyway. And besides, with my present job and work load, there's no point in getting bogged down with details about something that somebody else is going to be doing anyway."

Let's face it! You can't say these things any more! This is now a subject which you, as a military aviator, can't possibly escape. You can be affected from both sides. On one side, you may be the giver. On the other side, the receiver. Live long enough—and you will experience both!

But the search and rescue business is certainly nothing new. It's been around longer than we can remember. In some years past, there was a time when the pilot would call out, "Mayday! Bailing out!" and everybody and his brother would

Continued from preceding page

scramble to the scene, mill around, blacken the sky with flying machines. Ships would arrive, if the incident were over water, and make their contribution to the general confusion. Radio messages would fly thick and fast. Radio discipline and operational control of forces were theories only. Frequencies were blocked. Everybody was on the air. Nobody knew who was in charge, and nobody was.

Organization under the National Search and Rescue Plan

Today, we like to think we have better methods for organizing the confusion. It is all made possible by a plan called the National Search and Rescue Plan. This has proven to be a most practical and workable document when properly used. It assigns to the Air Force the responsibility for control of all Search and Rescue (SAR) operations within the Inland Region (the inland areas of Continental United States); and to the Coast Guard, the responsibility for control within the Maritime Region (generally the water areas); and to the overseas Joint Commander the responsibility for the Overseas Region. Under this Plan, the designated SAR Coordinator has at his disposal all civil and military facilities (ships, aircraft, vehicles, personnel) which can be made available for operations. No longer need there be any doubt about who is in charge.

As an example of the SAR organizations at the working level, let us consider the case of the Norfolk SAR Coordinator (who is actually the Commander, 5th Coast Guard District). His SAR area is designated "Norfolk SAR Sub Region" and covers the coastal area of Maryland, Virginia, and North Carolina and the high seas offshore. He works for the Atlantic SAR Coordinator (who is actually the Commander, Eastern Area, U. S. Coast Guard). He is responsible for assisting airmen and mariners in distress in his area. He operates a Rescue Coordination Center and *knows* in detail the number and readiness of most SAR facilities which are available for his use from the Air Force, Navy, Marine Corps, Army, Coast Guard, Civil Aeronautics Administration, and police and civil organizations. He will use Coast Guard units *first*, but he knows he can depend on outside help from other sources when needed. Joint coordinated SAR operations are frequent occurrences. In some full scale offshore searches, he has directed Coast Guard vessels, Navy vessels, Navy and Marine Corps aircraft, Coast Guard aircraft, and Air Force aircraft.

Photo courtesy U. S. Coast G

Coast Guard patrol boats can continue to search when vi ibility is too limited for aircraft. Crews are taught aircra signals which pilots can use if no radio communication exi — do YOU know how to direct this boat to the downe aviator you've spotted?

A similar organization exists for other Coast Guard Districts on both the east and west coasts of the United States.

And for the Air Force, the Continental Air Command is the Inland SAR Coordinator. SAR Sub-Regions have been designed, and SAR Coordinators have organized available forces for efficient joint operations.

Be sure to find out the SAR organization which applies to your operating area.

A Test of the SAR Plan

A young pilot recently had occasion to test the organization under this National SAR Plan. He missed one night carrier approach too many, took a final wave-off, and aimed his F4D toward the beach. He made the beach all right, but found some unforecast weather which called for an instrument approach. He quickly realized that he did not have enough fuel, broadcast his emergency message, flamed out two minutes later, and ejected. He landed in the ocean in the middle of the night about a mile offshore. Fifty minutes later he was sitting in an operations office drinking a cup of coffee.

His quick rescue was not just an accident. It had been carefully planned months before. Here is what happened: When the ground radio link received the pilot's "Mayday," the operator immediately alerted the SAR Direction Finder-Radar Net. Within the two minutes which were available before ejection, two sets of bearings were

taken and plotted, giving an accurate bailout position of 15 miles southeast of the nearest air station.

The Coast Guard Rescue Coordination Center was responsible for rescue operations. Within minutes the Controller in the Rescue Coordination Center took the following actions: dispatched an Air Force helicopter, a Navy helicopter, a Coast

"Surface target bearing 090, 12 miles" . . . it may be the survivor you're looking for — alert the lookout in the bow station as you head toward the target, stand by to drop a raft . . . and hope that you've found them.

Guard helicopter, amphibian, and two cutters; diverted an airborne Navy S2F to the search area; sent an emergency all-ships broadcast; dispatched Coast Guard beach patrols; and alerted local and State police, and military installations in the vicinity. The Controller designated the search area and the search pattern; assigned the On-Scene Commander (OSC) and the working frequencies.

After the pilot was located in the water, the Coast Guard OSC orbited the area and cleared out excess aircraft, while the Air Force helicopter made the pick-up.

The success of this operation had really been assured long before, when the civil and military agencies in that area had agreed to a SAR plan of action (SAR Agreement). From that agree-

All that water . . . if you've used up or lost your signalling devices, even splashing the water will help searchers to spot you if the surface is calm enough. A good search pilot will investigate anything that even might be a survivor, but conserving signals until reasonably sure they'll be seen is good insurance.

ment, the local SAR Coordinator had drawn up his SAR plan. This plan included all the necessary details for a workable operations plan: missions and task assignments for all participants; a concept of operations; operational control of SAR units; a short plan of communications; and permanent search area designations. He also established the operating procedures for the Direction Finder-Radar Net, whose primary mission is to assist aircraft in distress in the air. But pub-

VP aircraft should take full advantage of their multiple lookout stations to increase detection probability; airborne radars should seek echoes from the collapsible radar reflector carried in some raft kits.

lication of these rules and plans was certainly not enough to insure success. Practice operations and drills were conducted, until all participants knew the system and were familiar with the other fellow's capabilities.

Please turn page

Continued from preceding page

You—as a SAR Participant

The young jet pilot was on the receiving end of the rescue business in this case. But, the Air Force, Navy, and Coast Guard pilots were on the giving end. Some day, YOU may be on the giving end. Will you know your duties and responsibilities when you are a member of the rescue team? You cannot say that you will be doing your duty just to fly to the search area, bore a hole in the air, and take a good look around. The lives of survivors may depend on how well you know your job as a member of the newly organized "National Search and Rescue Club."

As a jet pilot, you might not participate in a search unit, except under certain circumstances. Most prop pilots, at one time or another, will. Both should know the duties of the SAR pilot.

You will find the details of these duties in the NWP-37 and, in a few months, in the National Search and Rescue Manual, now being printed. But, in a few words, the search pilot must always keep in mind things like this: Be sure your lookouts know what you are looking for, are interested and alert. Rotate them every 30 minutes. Keep them on the ball.

For small targets, search at 300-800 feet altitude. Have smoke lights ready to mark any target. Accurate navigation and careful spacing of track lines will insure best coverage. *Search* and *research* your assigned area. Small targets are extremely difficult to see in the open ocean. Search and research. Never assume 100 percent probability of detection. Cut out useless radio chatter, but make brief "ops normal" reports to your OSC. Report to him on your arrival and departure from search area, and obtain instructions. Comply exactly with those instructions. No free-lancing. He depends on *you* for proper coverage of your area. Use both visual and radar search. Remember that visual sightings are often made when a radar contact is not possible.

The survivors will be trying to attract your

What are your chances of being found — out here? Depends partly on how well organized and how well conducted the search is. From this altitude you'd be a pretty small object to see — but your radar reflector would be effective for a greater distance.

The On-Scene-Commander may be designated ashore, in which case he may have time to confer with the Search Coordinator. On the other hand, you may suddenly find you're an OSC while halfway between here and there . . .

attention with mirrors, flares, smoke signals, dye markers, flashlights, corner radar reflectors, and any means possible. They may have a Gibson Girl transmitting on 500 kcs or 8364 kcs. Tune your ADF to 500 and listen. If you have a radio operator, have him guard 8364 kcs. If you sight survivors, mark the spot with float lights and dye markers. Drop emergency equipment and life raft, if possible, and report the situation.

As a SAR pilot, you will be debriefed upon your return to base. You will report the on-scene weather, the targets investigated, the hours flown, the exact area searched, and the probability of detection, among other things. Your parent activity will consolidate these reports of each pilot into one message report to the SAR Coordinator. You need to know the system for estimating the probability of detection. Don't just make a wild guess! Be scientific! To get probability, use the graphs of Figure 7-24 of the National SAR Manual (Fig. 7-28 of NWP-37). Find the coverage factor (C) by dividing the sweep width (W) by the track spacing (S), or $C = \frac{W}{S}$. You will already know the track spacing which you used in the search; that is, so many miles between legs. You will find the sweep width (W) from Figure 7-2 of the National SAR Manual (Fig. 7-19 of NWP-37). As an example, say you were searching for a 7-man life raft in good weather and you used a track spacing (S) of 2 miles. From Fig. 7-2 of the National SAR Manual (Fig. 7-19 of NWP-37), we see that the correct sweep width (W) is about 1.6 mi. So if $C = \frac{W}{S}$, then $C = \frac{1.6}{2} = .8$. Enter Fig. 7-24 of the National SAR Manual (Fig. 7-28 of NWP-37) with the coverage factor .8 and your probability is 73% for the first search. Give the SAR Coordinator this information, as it will be very helpful in his evaluation of the incident and in future planning of the search effort.

This past winter alert lookouts were responsible for saving five airmen in high seas near Chesapeake Bay entrance after a ditching. Weather conditions were extremely poor. Fortunately, the CAA Traffic Control Center had a radar pinpoint on the distressed aircraft just before ditching. Surface vessels and search aircraft were quickly organized into a rescue force. Shortly after dusk, lookouts sighted flares in the fog and heavy seas. This rescue was possible because the lookouts were alert and interested.

The OSC Has An Important Job

Or, you may be the OSC and have several other aircraft immediately under your control. In this case, success depends almost 100 percent on you. You will normally be designated OSC by the SAR Coordinator, or if not, you may assume OSC as the first arrival on scene. Under certain conditions, it may be necessary for you, as senior pilot present, to relieve the OSC. Your main job is to assume control of all SAR units assigned to your area and to use them to search in the most efficient manner possible, taking into account the capabilities of units assigned, the sea, wind, visibility and other conditions on scene.

Be sure to instruct your searching units to search and research their assigned areas. Maintain discipline, including radio discipline. You will have two communications channels available, one for on-scene use, and one as a control channel between you and the shore radio link. You must guard both channels! For on-scene use, the primary frequencies are 282.2 mcs, 138.78 mcs or 121.6 mcs, and 3023.5 kcs.

Secondaries are 243.0 mcs, 121.5 mcs, and 2182 kcs. These secondaries are mainly for a first contact only and must not be used for general communications, except when everything else fails. The control channel is for use by the OSC only, in his reports back to the SAR Coordinator. These control frequencies may differ in the various SAR Sub-Regions, but will include both voice and CW frequencies. Find out what they are for your operating area. The OSC has important obligations both to his on-scene units and to the SAR Coordinator.

For the on-scene units, he must be radio guard, see that each has a search assignment and search

Continued from preceding page

pattern, and provide lateral and altitude separation when needed. For the SAR Coordinator, the OSC must let him know what is going on: send situation reports giving the on-scene situation, including weather and search conditions. Teamwork is needed. The OSC must have an appreciation of the overall operation and keep the SAR Coordinator fully advised in order that the operation may be continually evaluated and changes made when needed.

Here is the case of an OSC who took some direct action. One day we had a healthy pilot sitting on top of his one man raft off the coast of Florida—the survivor of a successful ditching, just waiting to be rescued. The ditching had occurred about noon. On scene, we had four search planes, one a Cuban, whose pilot fortunately spoke English.

As the afternoon wore on and still no rescue, there arrived on scene a P5M. The new arrival noted the on-scene situation: 4 aircraft searching independently, all at various altitudes 500 feet to 2500 feet; and most important, only two hours of daylight remaining. The VP pilot, from his previous briefing on this incident, knew that he was the senior pilot present (so, no toes to be stepped on as a result of his plan of action). He tactfully relieved the OSC and organized a parallel sweep (scouting line) pattern with the 5 search aircraft spaced 1½ miles apart and search altitude 500 feet. Just as the sun touched the horizon, the Cuban sighted the tiny yellow raft, and reported to the OSC. The P5M made the open sea landing and rescued the pilot, the direct result of proper organization of search forces by the OSC.

Functions of the SAR Coordinator

And some day you may be a SAR Mission Coordinator yourself. Quite often, the Sub-Regional SAR Coordinator must delegate the job to a local commander whose local knowledge and proximity to the distress scene puts him in the best position to assume control of the operation. *You* may be that Commander's SAR Officer. What to do? Lots of details in the NWP-37 and in the National SAR Manual. Fan the pages! Mainly though, common sense says do this: dispatch rescue forces; evaluate all information received; control forces assigned to the operations; keep interested agencies fully advised; and issue orders to rescue forces, including search patterns, search areas, and track spacing.

Search patterns? Search areas? Track spacing? You can say, "Well, just go on out to this general area, and have a good look around." The ocean is large. We need some practical method to be sure we are looking in the right place, and that we are covering that area with a reasonable probability of success. In the National SAR Manual and in the NWP-37 we can find dozens of pages on just exactly how to do that in the best possible scientific manner. If you are a student, you will break out the book and read it right now. If you are a scholar, you will remember it. If you are neither, you may say, "I can handle that when it happens by reading the book then."

It may be a bit difficult to read the book when you are being pressed on all sides for instructions. At the end of this article is the check-off list to end all check-off lists. It is the "Check-off List for Search Planning." It will quickly provide the SAR Mission Coordinator with the three things he most needs to know in organizing a search:

(1) the best search pattern,

(2) the correct search area, and

(3) the proper track spacing for search units.

You owe it to your shipmates to do the job right. This check-off list may help you do your duty. If so, make copies and keep them ready for use when you become SAR Mission Coordinator. This check-off list refers both to the NWP-37 and to the National SAR Manual, so that *either* publication may be used in planning the search. If you do not yet hold the National SAR Manual, use the NWP-37.

Use of the Check-off List to Plan a Search

Actual use of this check-off list may best be shown if we solve a problem. Say you are Operations Officer for CTG.24.1 in INTREPID off Cape Hatteras. You lose an F4D somewhere between Bass Intersection and INTREPID. Last radio contact with pilot was at Bass at 1245R where he reported severe turbulence. Pilot was inbound for INTREPID, experiencing some communications difficulty, and reporting critical fuel state. At 1310R, the situation is placed in the *distress* phase.

You become the SAR Mission Coordinator for CTG 24.1. You make a mental note to call on the shore-based SAR Coordinator for help later, but right now, you retain control and decide to launch some ADs for a quick sweep. You record the following information: INTREPID position is 60 miles east of Bass; ceiling 700 feet, visibility 1 to 7 miles in rain showers, surface wind 30 knots from 040 degrees, wind aloft at 20,000 feet is 60 knots from 060 degrees, seas 14-18 feet from northeast; Gulf Stream set is strong toward the northeast.

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This information is readily available to you, and is used to plan some immediate rescue action.

You have 4 ADs available. You designate the flight leader as OSC and instruct him to conduct a parallel sweep (scouting line) from INTREPID to a point 30 miles west of Bass Intersection; and upon arrival at that point, to conduct a multi-unit creeping line pattern back toward the INTREPID on axis 090 searching out to 15 miles on each side of the axis. You also specify a plane interval of one mile, a track spacing of one mile, and search altitude 500 feet. These instructions will get the wheels in motion until you can accurately calculate the proper search plan by your check-off list. After changing INTREPID'S course, you settle down with the check-off list.

Now that you have the problem set up, follow along with the check-off list for the solution. The answers are entered on the check-off list. The best search pattern is creeping line, since it is fairly well established that the F4D is between Bass and the INTREPID.

The correct search area takes a little figuring. Symbols correspond to those on the check-off list. The F4D's last accurate position was over Cherry Point, 160 miles from Bass. So, X = 10% of 160 = 16 miles. INTREPID is 60 miles from Bass. So, Y = 10% of 60 = 6 miles. Parachute drift is figured from 14,000 feet (the automatic chute opening altitude); and from Fig. 6-3 of the National SAR Manual (Fig. 7-2 of NWP-37); so, Z = 230°T 7 miles. Next, following the instructions on the check-off list, you record the following:

average sea current = 030°T at 11 mi/day
average wind current = negligible
local wind current = 250°T at 26 mi/day
current divergence = 250°T at 26 mi/day
leeway = 220°T at 18 mi/day
total life raft drift = 246°T at 33 mi/day
life raft drift error = 4.3 miles
total error of position = 21 miles
1st search radius R_1 = 23 miles

You now have a search radius of 23 miles for the Bass end of the search area. You are assuming that the F4D is down somewhere between Bass and the INTREPID. So, next you must calculate the search radius for the INTREPID end of the search area. All the previous calculations on parachute drift, liferaft drift, and liferaft drift error are still good. So, you are concerned with the F4Ds navigational error X. It is 10% of 160 + 60 = 22 miles. Total probable error of position then becomes 4.3 + 22 = 26.3. From Fig. 6-9 of Nat. SAR Manual (Fig. 7-8 of NWP-37), the 1st search radius is 30 miles.

From this you see that the "scientifically" correct search area lies between Bass and the INTREPID and is 23 miles wide at Bass and 30 miles wide at the INTREPID. Because of parachute drift, this search area must be displaced 7 miles 230°T. You decide to use an area 30 miles wide by 60 miles long, with axis 090° commencing at position 7 miles 230° from Bass.

Next, you check the proper track spacing for a 75% probability of detection. Following along with the check-off list you record the following:

√ coverage factor = .8
√ sweep width = .3 mi.
√ required track spacing = .38 mi.
√ area to search = 1800 sq. mi.
√ velocity of AD's = 150 knots
√ time to search = 4 hours
√ number of AD's = 4
√ calculated track spacing = .75 mi.

The desired track spacing for a 75% probability is .38 miles. With 4 ADs you can search the area with a track of spacing of .75 miles (about twice the desired track spacing of .38). So, you need 4 more ADs to do the job right, according to calculations. But, you know the pilot has orange smoke, which may increase the probability some. Ceiling and visibility conditions do not appear to warrant 4 more ADs in the search area. So, for the time being, you decide to use only the 4 ADs now searching. You send the OSC the following orders: "COMMENCE SEARCH FROM POSITION 7 MILES SW OF BASS X USE CREEPING LINE MULTI UNIT SEARCH PATTERN WITH PLANE INTERVAL ONE HALF MILE AND TRACK SPACING ONE HALF MILE X CREEP TOWARD 090 DEGREES TRUE."

It is true that you have done a lot of figuring, and you are not going to get 75% probability. But, search conditions are far from desirable. You have the satisfaction of knowing that your search plan was *not a guess*—and that you are conducting the most practical search possible under the existing conditions. And most important: you know the raft is going to be drifting at about 1½ knots toward the WSW, as long as the present weather continues. And furthermore, if the day search is negative, you have already calculated data which will be vital to planning the night search and next day's search. Only slight modification will be needed to allow for weather changes. You have the situation under control and you know it! A satisfying feeling!

You also know that the SAR Agreement provides that the shore-based SAR Coordinator may control incidents of this kind in which aircraft

Continued from preceding page

are en route from the beach to the carrier. You realize that the shore-based SAR Coordinator has available long range multi-engine rescue aircraft with well trained SAR crews, and has other procedures and facilities which can assist in this rescue. The CTG 24.1 decides to pass control to the shore-based Coordinator, if the day search proves negative. All essential information is next passed. At 1605R, the pilot is sighted in his liferaft by an AD. A DDR makes the pick-up an hour later. He is within the calculated search area. You had figured right!

A Suggestion to You!

The National SAR Plan and its supporting plans and manuals place all of us in the need-to-know category. We need to know: the SAR organization in our operating area; our duties when we become members of the SAR team; the SAR facilities on the ground available to help us; and the correct distressed aircraft procedures to place the SAR organization at our service. You will get some help—even if you don't know. But your own knowledge and procedures largely determine the efficiency and promptness of the assistance which is given. And in many cases, this bit of extra knowledge is important enough to be the difference between success and failure. Include Search and Rescue in your regular training program!

For information regarding what a lost pilot should do, refer to "Lost & Found," also written by Capt. Evans, appearing in July 1958 APPROACH.

CHECK-OFF LIST FOR SEARCH PLANNING

SAMPLE PROBLEM: F4D lost on 24 November 1958 between Bass Intersection and INTREPID. INTREPID position is 60 miles east of Bass. Last accurate position of F4D was Cherry Point. Ceiling 700'. Visibility 1-7 mi. Wind aloft at 20,000 feet is 60 knots, 060 degrees. Surface wind 30 knots, 040 degrees. *FIND:* search pattern, search area, track spacing.

1. *PURPOSE.*

This check-off list is intended to provide the SAR Mission Coordinator with an accurate and quick means of planning a proper search effort by determining: (1) the best search pattern, (2) the correct search area, and (3) the proper track spacing for search units.

Either the National SAR Manual or the NWP-37 publication may be used in planning the search. Use one of them, but not both. References in this check-off list apply to the National SAR Manual, and to the NWP-37 in parens.

2. *THE BEST SEARCH PATTERN.*

There are six basic search patterns. Modifications to these basic patterns are found in Chapter 7 of Nat. SAR Manual (Chapter 7 of NWP-37). Select the pattern which best fits the situation.

Situation	*Pattern*
Quick search between 2 points, or line of bearing search	Track Crawl
Target between 2 points	Creeping Line
Position is fairly well known	Expanding Square
Position is very indefinite	Parallel Track
Position is very indefinite, and several search units are available	Parallel Sweep
Search of mountainous terrain	Contour

3. *THE CORRECT SEARCH AREA*

The key to the search is determination of the correct search area. Five factors determine this area. Calculate the search area as follows:

a. *Navigational Error of Distressed Unit X*

A/C = 10% of distance from last known position, X = 16 mi.

Ship = 5% of distance from last known position, X = __ mi.

b. *Navigational Error of Searching Unit Y*

A/C = 10% of distance from last known position, Y = 6 mi.

Ship = 5% of distance from last known position, Y = __ mi.

c. *Parachute Drift in Bailouts Z*

Set will be downwind. Get distance from Fig. 6-3 of Nat. SAR Manual (Fig. 7-2 of NWP-37): Z = Set 230°T 7 mi.

Use Z to find estimated landing position of survivors. This position then becomes the best known position, and we plot drift from this landing point.

d. *Liferaft (or Vessel) Drift d*

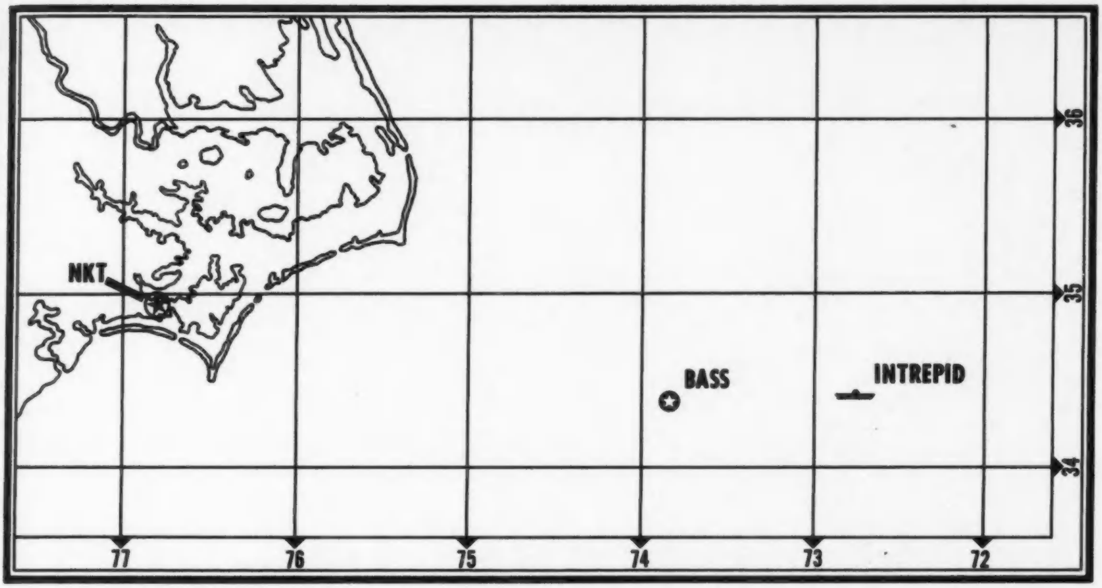
(1) *Average Sea Current:*
Use "Atlas of Surface Currents," and if steadiness of current is 25% or more, record the set in miles per day (mpd): Set 030°T 11 mpd.

(Ignore, if steadiness less than 25%)

(2) *Average Wind Current:*
Use "Pilot Chart" blue wind roses, and if steadiness of average wind is 25% or more, use Fig. 6-4 to get the set, and Fig. 6-5 to get the miles per day (mpd) from Nat. SAR Manual (Fig. 7-3 and 7-4 of NWP-37): Set 0°T 0 mpd.

(Ignore, if steadiness less than 25%)

(3) *Local Wind Current:*
Obtain local winds in vicinity of SAR incident. Use Fig. 6-4 to get the set, and Fig. 6-5 to get the miles per day (mpd) from Nat. SAR Manual (Fig. 7-3 and 7-4 of NWP-37): Set 250°T 26 mpd.



(4) *Current Divergence:*

From point O, plot the local wind current OA, and the average wind current OB. Current divergence in mpd and direction is the vector BA:

Set 250°T 26 mpd.

(5) *Leeway:*

Use Fig. 6-7 of Nat. SAR Manual (Fig. 7-6 of NWP-37:

Set 220°T 18 mpd.

Total Life Raft (or Vessel) Drift d

From point O, plot the average sea current OC, plot the current divergence CD, and plot the leeway DE. Total drift d in mpd and direction is the vector OE.

d = Set 246°T 33 mpd.

e. *Life Raft (or Vessel) Drift Error d_e*

One-eighth of total drift (⅛ x d)

d_e = 4.3 mpd.

Total Probable Error of Position c

Use formula: $c = d_e + \sqrt{X^2 + Y^2}$

where c = total probable error of position

d_e = life raft (or vessel) drift error

X = Navigational error of distressed unit

Y = Navigational error of searching unit

c = 21 miles

Search Radius R_1

Enter Fig. 6-9 of Nat. SAR Manual (Fig. 7-8 of NWP-37) with probable error c and obtain the first search radius, R_1

R_1 = 23 mi.

This is the answer we have been working toward. It is the radius for the *first* search. To get radii for 2nd, 3rd, 4th, and 5th searches, use Fig. 6-9 of Nat. SAR Manual (Fig. 7-8 of NWP-37). Center the search area at the last known position, adjusted for parachute drift Z if necessary and *displaced by the total life raft (or vessel) drift d.*

Search Area When Position is Known

This area will be a circle with search Radius R_1 with the center *displaced by the total drift d.* See Fig. 6-12 of Nat. SAR Manual (Fig. 7-11 of NWP-37).

Search Area When Position is Not Known.

Search area will lie between last known position and destination. Calculate separate circular areas for last known position and the destination, and displace each by the total drift d. Draw tangents to these displaced areas. This gives the search area. See Fig. 6-12 of Nat. SAR Manual (Fig. 7-11 of NWP-37).

4. *THE PROPER TRACK SPACING FOR SEARCH UNITS.*

P = probability of detection C = coverage factor
W = sweep width S = track spacing

For the 1st search decide on the desired probability of detection P.

P = 75%

(75% is usually a good figure for the 1st search)

Enter Fig. 7-24 of Nat. SAR Manual (Fig. 7-28 of NWP-37) with P to get the coverage factor,

$$C = \frac{W}{S}$$ C = .8

Enter Fig. 7-2 of Nat. SAR Manual (Fig. 7-19 of NWP-37) to get sweep width W........ W = .3 mi.

Compute the required track spacing S

from the formula $S = \frac{W}{C}$ .... S = .38 mi.

Area to be searched A .... A = 1800 sq. mi.

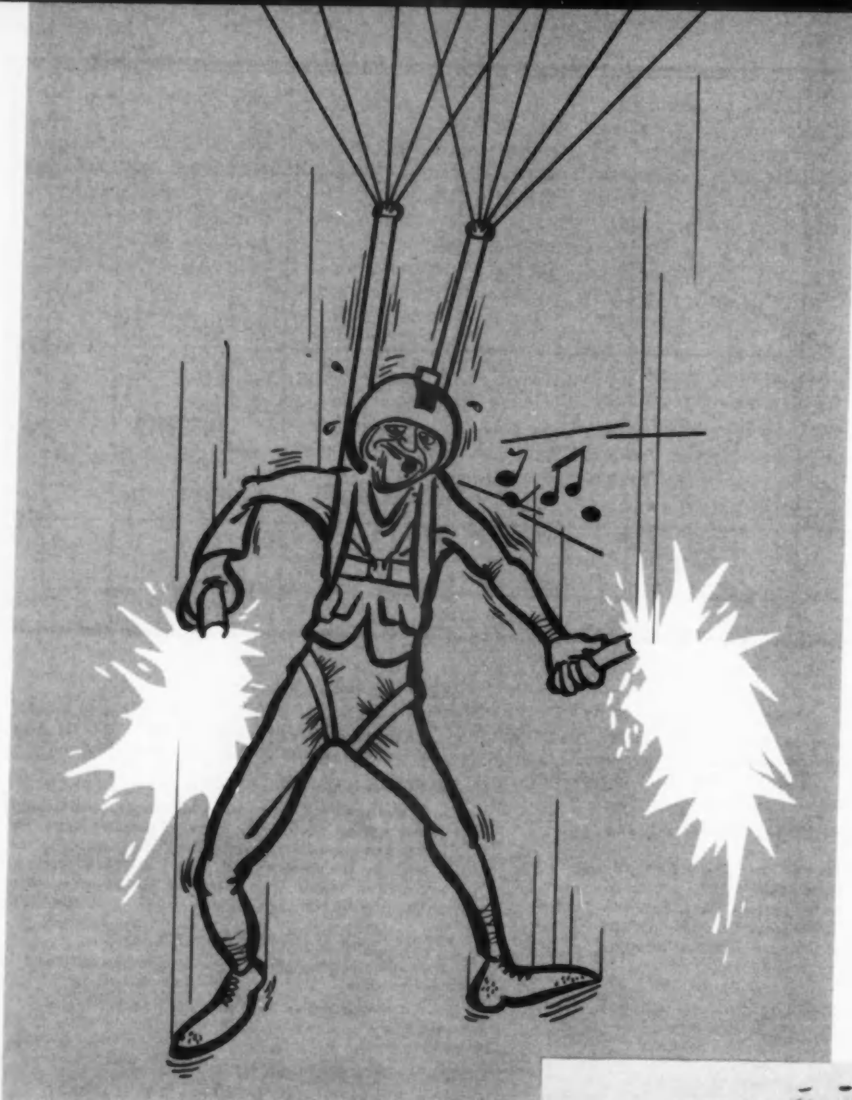
Velocity of search unit V........ V = 150 kts.

Time for searching on scene t........ t = 4 hrs.

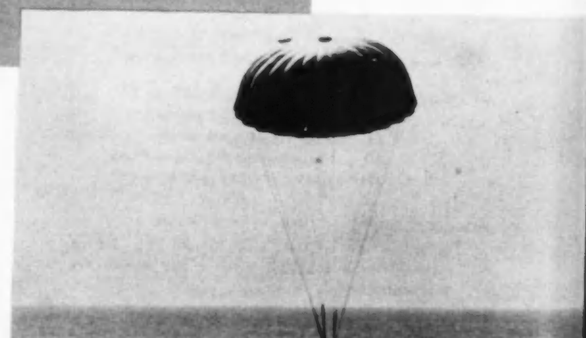
No. search units used n........ n = 4

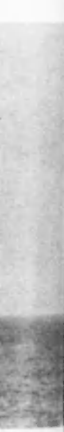
Track spacing $S = \frac{A}{nVt}$ .... S = .75 mi.

If the calculated track spacing for this situation is equal to or less than the desired track spacing, the desired track spacing is feasible. If not, reduce the search area; or, use the higher track spacing with lesser possibility of detection. ●



POCKET THAT ROCKET!





SIGNALING during parachute descent over water can cost you your life if by doing so you neglect vital survival procedures—getting back into your parachute sling, breaking out your pararaft and getting ready to slip out of your parachute harness on entry into the water. Avoid the temptation to use up valuable minutes during descent firing tracers or flares or blinking your flashlight. The possibility of a successful rescue due to the result of your signals being observed is far outweighed by the danger of drowning because of your incomplete preparations for a water landing, and your inability to judge height and rate of descent accurately . . . and your flares may damage your parachute canopy shrouds or harness.

Two recent accidents illustrate the dangers of expending time signaling during parachute descent.

Case 1: During parachute descent, one F3H pilot spent his time blinking his red lens flashlight when he should have been getting back into the parachute sling, unbuckling his chute straps and removing his pararaft from its envelope. As he entered the water, the surface wind blossomed his parachute and dragged him across the wavetops. When he finally released the harness snaps, the parachute pulled his harness, with the pararaft still in its container, away from him. (For reasons unknown the pararaft lanyard became unattached from his life vest.) This left him with only his life vest and G-suit for flotation. He was rescued by destroyer whaleboat after being in the water for two-and-a-half hours.

Case 2: An F4D pilot was picked up in the ship's searchlight beam during his descent. As he came down he fired tracers from his pistol. After entering the water, he was seen being dragged by his chute until he disappeared from view in the darkness. He fired another round of tracers after he was lost by the searchlight beam.

The pilot's body was recovered by motor whaleboat crew about a half hour later; his legs and torso were bound by the parachute shroudlines.

The flight surgeon on the accident investigation board made the following comments:

"One of the pilot's squadron mates who ejected the previous night was apparently lost and presumed drowned. The pilot probably visualized this happening to him and became preoccupied with making himself seen. In the panic of the moment then, he got out his service pistol and began firing tracers during his descent.

"It would be difficult if not impossible to do this and at the same time get back in the chute sling and unfasten the straps and the pararaft quick-disconnect as should be done. (If he had unfastened his harness straps,) the strong winds would have quickly carried the chute away from him as soon as he hit the water and separated from his harness. Instead, he probably began getting out of the harness after entering the water and became tangled in the shroudlines during this time. He got out of his harness but not before getting hopelessly tangled in the shrouds. He apparently got his pararaft assembly out of the container as it was not with the parachute and was not recovered . . . he was pulled through the swells feet first (by the parachute) and drowned before rescue could be effected."

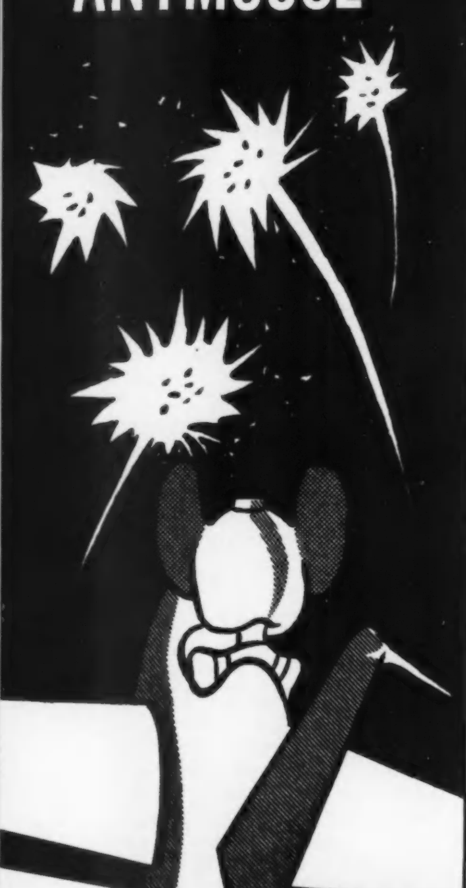
Although the pilot in Case 1 spent time signaling during descent, he got by with it; the pilot in Case 2 did not.

A parachute descent over water is neither the time nor the place to count on luck or rescue parties taking care of you. It is the time to prepare for your entry into the water. Once you are in the water, free of your parachute and harness and in your inflated pararaft, you can safely begin to signal your location.

Preparations for successful parachute landing in water require the mastery of techniques which are often difficult. Frequent and adequate training in these techniques should be the personal concern of each naval aviator. If you haven't recently had training in these techniques (and by that we mean *live*, not textbook training), keep after it until you find or make the opportunity.

You should practice until you can demonstrate to your own satisfaction and that of a competent observer that you can carry out all the procedures necessary for a successful parachute descent and entry into the water. There is no substitute for initial and refresher training to build self-confidence and to establish a subconscious reaction ready for the time when an ejection or free bailout becomes necessary. ●

ANYMOUSE



ANONYMOUS REPORTS: Report an incident, prevent an accident, by sending in your Anymouse Report today!

BURNER BANGER

THERE have been times when I have been tempted to write an Anymouse but never thought my tales hairy enough. My experience last night though, shook me up like I've never been shook in my three short years of flying.

To begin with I have over 300 hours in the ever-forgiving F11F-1. The first 2 hours of my hop were pretty routine with a GCI workout followed by several touch-and-go landings. With 1200 pounds of fuel I called for a final landing and double-checked my gear and flaps. A normal mirror approach was made although I did not notice the wheel watch's light in my eyes.

After touchdown I retarded the throttle to IDLE and put my afterburner override switch in the OPEN position (definitely not squadron procedure) to cut down on residual thrust and make it easier to slow the aircraft. With about 4500 feet of runway remaining and some 100 knots on the airspeed indicator, the sky became red with flares and the tower told me to take it around.

I hesitated for a moment but then the thought of some other joker trying to take the duty runway made me decide to give it a try. I added power and when the aircraft did not accelerate fast enough I went into the burner detent. Here I want to point out that with the override switch in the burner open position, the burner will not light off but the nozzle will remain open and if the throttle is in the afterburner detent, fuel will be dumped overboard.

At 125 knots and with the angle of attack at 21 units I staggered into the air with very little or no runway remaining. There was no aircraft acceleration beyond this point. I couldn't gain altitude and my immediate thought was that I was on the back side of the old curve so I raised my gear. This allowed me to climb to 100 feet but the picture was still dim. I couldn't turn and with a highly populated area dead ahead the question was rapidly becoming one of "where" to crash.

A frenzied check of the instruments revealed a low TPT which indicated an open afterburner nozzle. I flicked the override switch to the normal position and the burner lit off with a lovely kick in the pants.

I had done the possible but highly improbable act of making a nozzle open, basic engine takeoff. This gives approximately 50 percent power available at 100 percent rpm. No need to say I was shook but, due to the fuel dumping overboard, I was now at low state and called for a downwind entry. An uneventful landing followed.

What was the waveoff for? Well sir, the wheels' watch Aldis lamp had burned out and after I landed he fired a flare to notify the tower. The crash trucks along the runway followed suit and fired many more. The tower operator saw all the flares and gave me the "go around."

Believe me, there's going to be no next time on this afterburner thing. I put the word out at the next APM and made some confirmed believers.

HOT SPOT

IT WAS a good morning for flying, CAVU and with the wind down the duty at 20 knots, and this Anymouse was scheduled for his second syllabus rocket/strafe hop. Five hours of AD flying the day before had left me a bit tired after several weeks of light flying but I figured everything was okay and decided I could take two-point-five on target.

The flight of six arrived at the arming area but the ordnance crew wasn't on station. I was beginning to feel the heat of the sun as well as that of the R-3350, so the canopy was opened. Mistake number one. It didn't take long for the 90-degree port x-wind to fill the cockpit with exhaust fumes but I decided to go on oxygen rather than suffer the heat with the canopy closed. Mistake number two happened here. Contrary to unit policy, my oxygen mask was stowed in its canvas sack. After several minutes of groping and fumbling it was finally secured in place. Then, because I had neglected to check out the oxygen system in the chocks, I discovered that I could not inhale through the mask at all. Several more minutes went by before this was remedied, and then I could breathe only with difficulty.

"Oh well," I figured, "everything will go well after takeoff." So, I elected to continue. Arming was finished, the launch expedited, and the flight was cleared to the target soon thereafter.

The rocket runs were scheduled as 40-degree glide runs commencing at 6000 feet, with release altitude at 2300 feet, 320 knots indicated. The first two passes were routine with the exception that I experienced a feeling of extreme mental discomfort brought on by the appearance of the target from the cockpit. However this anxiety was dismissed when I was told by the target crew that these early runs had been steep and I decided to shallow out next time around. Also, the hits had not been bad and this Anymouse figured he had the gouge for a bullseye next time.

On the third run I commenced a normal entry and eyed the altimeter intermittently awaiting the 2300-foot indication; 2300 came and went as I was squeezing in some last second corrections.

Finally I pickeled, but no fire. I pickled again. Still no fire. Only then did I realize the 400-foot diameter target was occuping my entire field of vision. About the same time I realized I was being called on the radio to "pull out!"

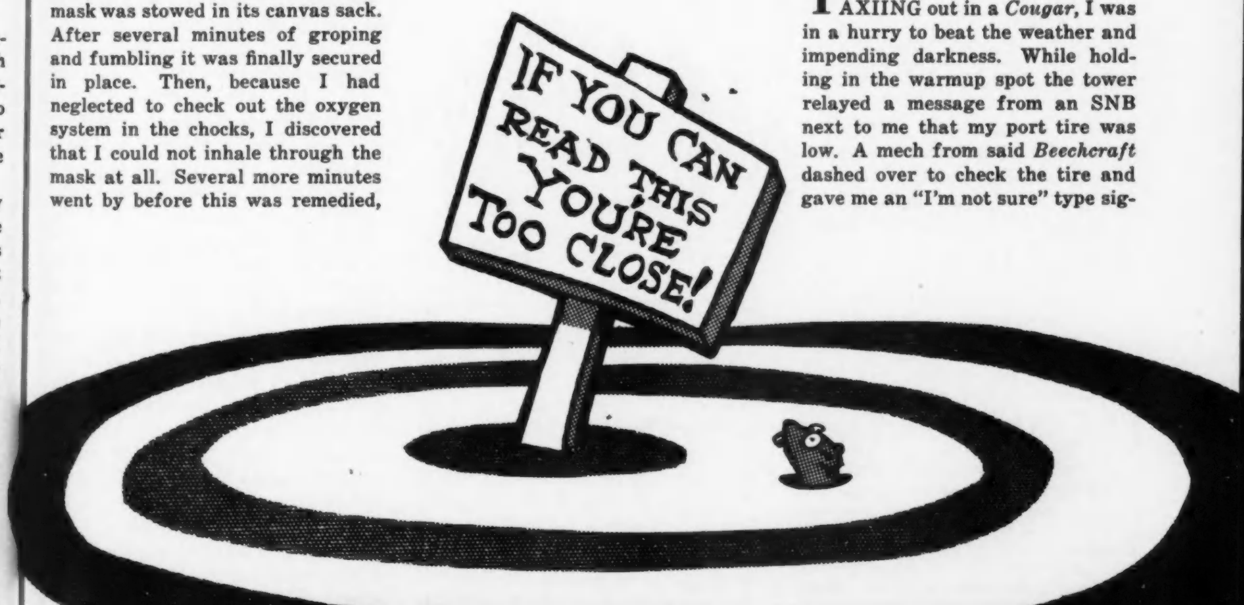
This pullout was initiated in a somewhat panicky manner. Before the G-pull dropped the black curtain, I read 300 feet on the altimeter and could still see the extremities of the target area over the cowling.

Daylight returned at 4600 feet, 80 knots, nose about 60 degrees above the horizon. The accelerometer was reading 8 G.

Carbon monoxide? Fatigue? Low G tolerance? Target fixation? I won't attempt an explanation but I have added some items to my checklists and added some personal policies to my procedures.

SQUEEZE PLAY

TAXIING out in a *Cougar*, I was in a hurry to beat the weather and impending darkness. While holding in the warmup spot the tower relayed a message from an SNB next to me that my port tire was low. A mech from said *Beechcraft* dashed over to check the tire and gave me an "I'm not sure" type sig-



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nal. Considering my age (LCDR type) and experience (5600 hours, *Stearman's* to *Cougars*) my reaction was less than adult.

As the ATC clearance was still pending I thought I'd check the tire myself. Loosening my straps I stood up in the cockpit and bent over the windscreen to look back at the port tire, making sure the aircraft was not moving.

I could not quite see the tire so I tried again and stretched further. This time I sensed impending disaster (literally) as I felt the canopy sneaking up from behind. Too late! I couldn't move fast enough to get my arm inside to reach the accidentally actuated canopy handle.

So there I was. Being firmly crushed, with pressure against the small of my back and pelvic bone, between the canopy and windscreen. All I could think of was "This is a hell of a way for an old (?) fighter pilot to die!" because I didn't think anything would stop the 1500-pound pressure.

The pilots in the SNB saw the situation develop and the race started. Number one mech got over to me first and was familiar with the outside handle release. He freed me seconds later. I estimate I was under pressure for 8 to 10 seconds but it seemed 8 to 10 minutes. I slumped down in the cockpit in a state of shock but felt much better when I found I could move

my feet and legs. A couple wiffs of 100 percent oxygen helped too.

The ambulance arrived shortly thereafter and I spent two days in sick bay for a sore back but with no broken bones. This was perhaps the stupidest but luckiest accident of 1958; no injuries, no aircraft damage, no money lost.

Two lessons should be highlighted:

You can't see F9F-6 tires from the cockpit.

Second lesson: therefore at least kick both tires prior to flight.

EYEBALLS CAGED

"ONE HSS-1 was returning to to base and I was pilot of an HSS-1 heading out from the base. The ceiling was 1000 feet with visibility about 8 miles.

"I saw the other helo coming head on at about 3 miles and purposely waited to see how long it would take for him to see me. Apparently he never did because I had to take evasive action and while I was turning he just continued straight on.

"I recommend putting fluorescent paint on ASW helicopters as their mission does not require camouflage."

NO O_2 EQUIPMENT

THE flight was planned for an ETE of 2 plus 30 with 6000 feet requested. Our destination was reporting only 2° dew point spread, so my copilot and I took the forecast with a grain of salt: It was supposed to be 800 and 1 in light rain and fog by the time we got there.

Shortly after takeoff we were cleared to climb to and maintain 11,000 feet. Although we didn't like it (there's no oxygen in an S2F) we complied and the flight proceeded otherwise as planned. A lower altitude was requested at

each position report and refused, probably due to the fact that we were flying in high density areas throughout most of the flight.

Arriving over the homer at destination we were instructed to hold, still at 11,000, and about 10 minutes later were cleared to 7000 feet in the holding pattern and turned over to GCA. At this point our suspicion of the forecast was confirmed when GCA passed us the present weather of 300 and a half. Still no sweat (minimums are 200 and ½) and we started on in.

It was at this point that a few events happened which I now believe were symptoms of hypoxia. First, GCA gave us a heading of 080 and I promptly turned to 180. When the copilot corrected me, I felt irritated at his interference. Two other times I wandered off my assigned heading, noticed it, and got back on again.

When we turned off base leg onto final approach the fun really started. We were informed of a tailwind of 10 to 12 knots (only one GCA pattern). I anticipated a steeper than normal glide slope and was in the process of interpolating the power setting when we started down. There was some mild turbulence but it seemed that I had much more trouble than usual holding a heading. The only time we were on the glide path was while we were going through it. Finally at two miles and way high, I took a voluntary waveoff, just ahead of the waveoff given by the GCA controller.

Looking back, the thing that seems most peculiar is the fact that all through this hairy approach, and the next one, I was as calm as a kitten getting a back scratching.

The second approach showed a marked improvement. Seldom was I more than five degrees off heading and always within 100 feet of the glide path. At one mile from touchdown the controller reported us going low on the glide path followed by 50 feet low and then a waveoff. Simultaneously I saw the runway close ahead and slightly to the right. The landing was uneventful except that I used most of a 7000-foot runway to get stopped.

In the future I intend to be more forceful with ATC when I have no oxygen equipment and insist on a lower altitude when extended cruising is planned.

(OpNav Inst, 3710.7A, pages 19 and 20, sets forth the requirements for the use of oxygen in non-pressurized aircraft—Headmouse)

HANDLE MAN

IT WAS an MCLP hop in an AD. On the last two previous days there had been two gear-up passes which cost Anymouse in the neighborhood of $12.00 each. Very aware of this I kept saying this can't happen to me.

Abeam I called "Gear-down-and-locked" and then I had the adrenalin pumped through my little bitty body as the mirror officer said "Boy I can taste that scotch now." Moral: When you call them down have your hand on the lever!

CHANGE BEFORE CHARGE

UPON finishing a readback of my clearance on ground control, I was told "Clearance correct, takeoff on runway three, wind from the north at 05 knots." I mistook this for clearance for takeoff with almost disastrous results. Adding power to my AD, I taxied to the very edge of the duty runway when the old habit of "looking before entering" paid off. There, big as life, was an R4D (landing lights and all) a quarter of a mile from the threshold.

The tower was apparently trying to warn me on channel one but I had not switched back upon finishing with ground control. As I switched, slightly flustered at my near prang, I heard the tower asking if I read them. Of course I had to answer "LOUD and CLEAR."

Corrective action: Switch to tower frequency for takeoff clearance even if ground control doesn't tell you to change channels.

The purpose of Anymouse Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hairy or unsafe flight experiences. As the name indicates these reports need not be signed. Forms for writing Anymouse Reports and mailing envelopes are available in readyroom and line shacks. All reports are considered for appropriate action.

monitor

Make Test Areas Known

Information received thus far on local test areas at various stations does not mention what, if any steps have been taken to make the designated area known to all air traffic. The safety board is of the opinion that such an area is not serving the purpose for which it was designated unless all air traffic is made aware of its existence.—*VR-32*

Night Wheel Watch

It was stated that a requirement existed for a qualified aviator to supervise the wheels watch during night operations of fleet aircraft. It was decided that the Air Group Commander of squadrons conducting night air operations would assign pilots to supervise the wheels watch in the interests of landing safety. —*FAirAlameda*

Crossing Runways

Recommendation: That vehicles (except crash vehicles) come to a stop and be cleared by the tower prior to crossing any runways and that vehicles on the taxiways stop when an aircraft approaches them.—*MAG 31, MCAS, Miami*

Hardhats, Too

It was recommended that the squadron adopt a policy requiring pilots and crewmen to wear protective helmets in multi-engine operational model aircraft during takeoff and landing and to keep them readily available in flight.—*VRF-32*

Below Average Aviators.

A recent accident had disclosed that the pilot had been transferred from two squadrons due to being below average and due to illness. Other aviators who hadn't measured up to standards had been transferred late in the training cycle, thus depriving other pilots of valuable flight time. Below average aviators should be selected out early in the training cycle, given evaluation boards, and should not be recommended for transfer to another squadron. *FAir Alameda*

Inspection Team

Reports and inspections indicate PPM maintenance of higher quality than under previous system. At this time there is a limited number of inspectors in each unit. A Quality Control Branch is to be established at Wing level, comprised of one senior NCO of each MOS. This branch will be utilized to assist units at random with maintenance problems, and to instruct maintenance personnel in order to obtain quality of maintenance in the wing.—*3rd MAW*

EXCERPTS FROM SOME OF THE NAVY'S SAFETY COUNCILS THROUGHOUT THE WORLD, WHO PROVIDE LOCAL LEADERSHIP AND EMPHASIS TO THE NAVAL AVIATION SAFETY PROGRAM.

Barometer

". . . to ensure that our pilots attain and maintain this desired degree of well-rounded knowledge of aviation, a corresponding degree of close and continuous supervision is mandatory. It is for this reason that I am firmly convinced that a squadron's aviation safety record is an excellent barometer, measuring the degree of supervision exercised in that squadron. . . ."—*RADM L. K. Rice, ComFAir Quonset, Northern area*

Channel Changing

OpNav Notice 3750 of 8 August 1958 quoted in part "Numerous undetermined accidents have occurred subsequent to changing UHF/VHF channels under low visibility conditions during climbouts and approaches" was discussed. All pilots will be briefed concerning this matter. An appropriate arrangement with Minneapolis Tower to eliminate changing channels during low altitudes of approach and climbout will be effected by the Station Safety Officer.—*APB Minneapolis*

Maintenance Safety Officer

ComFAirJax is issuing an Instruction which will require squadrons to assign an officer of the maintenance department a collateral duty as maintenance safety officer. The duties of this officer will be to eliminate dangerous situations which exist because of ignorance of personnel, lack of proper supervision or lack of adequate instructions.—*Southern area*

Open Door Policy

ADM Carson pointed out to COs not to keep the Safety Officer cooped up in his office . . . to maintain an open door policy where the Safety Officer can discuss items with Ops, Training, Maint., Executive and COs. The Aviation Safety Officer has had special training at Navy expense and must be allowed to get out and discover problem areas and recommend solutions and improvements to prevent needless loss through preventable accidents and mishaps.—*CNABaTra.*

Nix Please

Safety officers were advised to stay clear of flight violations if at all possible. The assignment of safety officers to the investigation of flight violations borders on violation of existing OpNav Instructions on the investigation of aircraft accidents and the accident prevention program. Safety officers should also insure that no reference to an AAR is shown on any part of a JAG investigation. JAG investigation, if possible, should not be assigned to the Aviation Safety Officer. Although both investigations may proceed along the same lines, one is for aircraft accident prevention and the other for line of duty or misconduct findings.—*3rd MAW*

Before this airship could be moved into the hangar, an unpredicted heavy snowstorm dumped enough wet snow on the envelope to rupture it.

SAD SACK

THE blimp had been moored outside the hangar Thursday night in order to expedite Friday's flight schedule. At 0600 Friday morning, aerology's forecast for adequate lighter-than-air flying weather was still true but the picture was beginning to change for the worse. Rain began falling at 0645, the ceiling lowered and the wind strengthened.

At 0745 the duty officer checked the weather and on the basis of present weather plus a revised forecast the flight schedule was cancelled. Snow was now falling instead of rain. Although the air station was located in the northeastern U. S. where snow is no stranger, this was nearly mid-April and the snow came as a complete surprise.

At 0800 the duty officer went outside and inspected the airship. Snow was beginning to accumulate on the envelope, making the blimp heavy, and he decided to move it into the hangar as soon as possible.

Ten minutes later the urgency of the situation became clear. Heavy, wet snow was now falling and it was accumulating rapidly on the blimp. All water ballast was released and armament removed, a total of over two tons. During this time preparations for moving the airship had been

continuing and now it was started toward the hangar. There was less than a quarter of a mile to travel but as time passed it appeared to be an unequal contest.

Movement toward the hangar was very slow because of the extreme heaviness of the airship. The oleo of the main landing gear became completely depressed and both tires were almost flat. Three tons of fuel were dumped and line personnel began taking off removable accessories in an effort to lighten the blimp but it was too late. Half the distance to the hangar had been covered when the port tire burst. Further movement was impossible.

Since it was no longer possible to get the airship under cover all efforts were concentrated on removing weight. Additional helium was also pumped into the envelope to increase the lift. Weather at this time was recorded as a precipitation ceiling of 100 feet with visibility ¼ mile in moderate snow and fog. The snow was gaining but one more step was planned to try and save the blimp. A high tower ladder was brought up by the fire department and high pressure water from a fire hose was to be played on the envelope to remove the snow. Before this could be accomplished however, the airship tail started to droop.

Tiredly the blimp gave up the struggle. It began listing to starboard and when the starboard lower fin was about 10 feet off the ground the envelope ruptured, the tail section immediately deflated and the remainder of the envelope sagged to the ground. Nearly six tons of weight had been removed or jettisoned but this fell far short of the estimated 23,000 pounds of wet snow that accumulated on the airship and caused the accident.

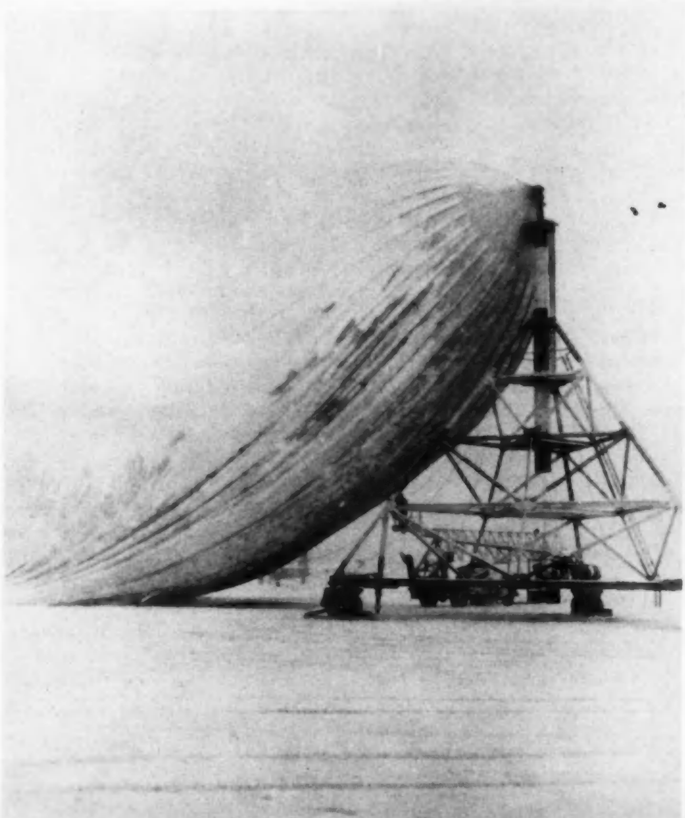
Please turn page

BLIMP PILOTS PLEASE NOTE

Among the various types of aircraft with which our pilots may have had experience, airships are unique in at least one respect that concerns flight safety—that is the capability of remaining airborne with complete safety even after failure of major controls or main propulsion. This fact seems to have become obscured in the day-to-day operation of modern airships, since they are flown almost continually from takeoff to landing in a heavy condition. Pilots get accustomed to flying an airship like a modified airplane, even to the point of reacting in emergencies in the same manner as they would in an airplane.

There is an urgent need for review and re-emphasis to all pilots of the *static* safety inherent in an airship. High airspeed in itself is not essential to safe and effective control. As long as power remains and the envelope is intact the capability exists to ballast or valve into an approximate equilibrium condition. This gives the capability of the slowest possible airspeed, consistent with the overall situation, without limiting the pilot's choice of high speed if that is indicated. In other words, the pilot gives himself the maximum freedom of choice.—*Com Fleet Airship Wing One*

Ballast was jettisoned but a blown out tire made further movement impossible.



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RED FACED—This story concerns an engine run-in on a T-28. The aircraft had recently come out of engine change and the pilot was told to run it in for a couple of hours. Upon completion of the flight, the pilot was a little agitated and wanted to see the maintenance officer—pronto!

He addressed the maintenance officer with "Look what hit me in the face during my engine run-in?" and in the hand of his outstretched arm were a pair of needle-nose pliers.

Now this presented the maintenance officer with two headaches:

APC No. 1—How can he impress upon his mechs the dangers of leaving tools in aircraft?

APC No. 2—Why can't the engine run-in pilots conform to instructions and stop doing acrobatics on engine run-ins?

Needless to say the pilot's face was a bit red as he sneaked out of the maintenance Office mumbling to himself "Something backfired!"—*BTG-1 "Plane Sense"*

Landing with one tip tank full, the pilot flared too high.

TIP OFF—During a night cross-country hop in VFR weather, the port tip tank on a TV-2 gave indications that it was not transferring properly. When the starboard tank was empty (tip tank fuel warning light illuminated) and the pilot was sure the left tip would not transfer he decided to land as soon as possible. He reversed course and commenced letting down toward a nearby air station.

Advising the tower of his difficulty the pilot set up for a long final approach. Earlier he had found the aircraft controllable at 150 knots but decided to fly the final approach at 160 knots: The duty runway was 8000 feet long. Having elected, said the accident board, to attempt a landing with one full tip tank, several factors entered the picture. Although the procedure is an exacting one, the TV can be landed in this condition.

Airspeed control and depth perception are two critical requirements in accomplishing a safe landing. This is more difficult under conditions of darkness. As airspeed decreases below that value required to maintain lateral control in an asymetric load condition, if the flare-out is too high, it will not be possible to effect a safe landing.

The jet was over the end of the runway at 160 knots but the pilot started his flare-out too high, at an estimated 10 feet above the surface. Initial touchdown was 3500 feet from the approach end with a hard contact on the left main wheel and nose wheel. After porpoising twice the nose strut sheared and the TV-2 skidded to a stop on the nose.

In the subsequent discussions the pilot said he had the illusion that he was lower upon flare-out than he actually was. As he was considered well qualified and was aware of the hazard of flaring too high the apparent cause of the error is of interest. The runways at the pilot's present and last duty stations were 200 to 250 feet wide but the runway where the accident occurred was 400 feet wide. Since the runway lights were farther apart than those he was accustomed to using in judging his height, the illusion of being close to the ground resulted.

More than this however, was the basic error of failing to immediately secure the tip tank transfer to prevent an uncontrollable unbalanced load. Once this condition was allowed to develop, noted the accident board, the pilot again erred in not jettisoning the tip tanks in an area of open water in the immediate vicinity.

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BE SURE

These excerpts from a recent aircraft accident report highlight the oft-repeated warnings of many professional pilots to the effect that the altimeter—regardless, and some times because of its modifications—remains one of the most potentially dangerous instruments in the cockpit. Be sure when you read yours!

The Investigation. . . . Analysis of the evidence gained leads to the incontrovertible conclusion that the aircraft contacted the ground in controlled flight with little or no warning to the pilot. The accident occurred (an hour before midnight) at an elevation approximately 10,000 feet below the altitude at which the pilot had reported himself 10 to 20 seconds before the crash. The remainder of this investigation is of factors involved in the discrepancy.

After passing the TACAN outbound, the pilot had been cleared to descend to 8000 feet and to report passing 12,000 feet. He had reported his crossing altitude as 23,000 feet and subsequently reported also at 22,000 and 20,000 feet. The timing of these reports indicates a steady descent of about 4000 feet per minute, which is standard for this approach. The speed outbound was about 240 knots IAS, which is also standard.

Reconstruction of the actual flight path based on the altitude of the point of contact and the above rates indicates that the station was actually crossed at about 13,000 feet. . . .

The Analysis. . . . Assuming that the altimeter was misread, the flight is reconstructed as follows, beginning with the pilot's second "on-top" report. A climbing left turn in afterburner was performed and during the turn the pilot lost track of 10,000 feet; the expectation of a rapid climb in afterburner would enhance this.

On reaching 13,000 feet the pilot interpreted the indication as 23,000 feet; at this altitude the tens of thousand foot tab (MB-1 altimeter) is hidden by the instrument light (F8U aircraft). A striped area would be shown in the lower portion of the instrument, but once the pilot had convinced himself that the altimeter read 23,000 feet this striping would be excluded from the scan. During the subsequent descent the pilot's scan included only the hundreds and thousands points and there was no change from black to striped in the low altitude indicator to direct attention to this warning . . .

23 100′

13 100′

WHIZ QUIZ

1. Can the CO of NAS "B" revoke an instrument rating issued to you by the CO of NAS "A"?

2. What's the purpose of the D-Amphetamine Sulfate tablets in your PSK-2 kit?

3. Filing from NAS to an AFB, can you expect to find NOTAMS for the AFB in the NOTAM file?

4. Taxiing out for the PM launch, you make a sudden stop to avoid an NC-5 scooting across your path; the tiger behind doesn't see your stop in time, swerves, collides with your tail and causes "D" damage to you and no damage to himself. Do you have an incident, a Ground Accident, or an aircraft accident?

5. Why is the notation "Special handling required . . . " supposed to appear on each page of an Aircraft Accident Report? Is it a security classification?

6. Normal flying for airplanes is flight in which the acceleration does not exceed ___ g and the angle of bank does not exceed ___ degrees.

See WHIZ QUIZ answers on page 48

notes from your flight surgeon

Fatigue Again

THE Late Late Show is not for pilots scheduled to fly early the next morning. After flying a night formation hop, an AD-4 pilot checked out at the hangar at 2230. He went home but instead of hitting the sack he sat up and watched a movie on TV until 0030. Four to five hours' sleep and he was up again for a session of touch-and-go landings.

In addition to lack of sleep, the pilot had skipped breakfast and supper the day before; during the entire day he had eaten only a small lunch of hamburgers.

Poor eating habits and lack of sleep added up to one aircraft accident—Charlie damage.

Pain in the Jaw

RECENTLY a flight instructor reported to his flight surgeon with a pain in the right jaw which subsequently developed into a severe case of inflammation around the joint. Checking into the case, the flight surgeon found that the pilot's APH-5 helmet was exerting considerable pressure on the jaw joint. Other physicians agreed with the flight surgeon that the pressure had aggravated, if not actually caused, the pilot's condition.

The flight surgeon reports that he has had numerous complaints from pilots that their APH-5 helmets hurt their ears. Any pilot whose helmet hurts his ears has a very poor fit and should see his parachute rigger at once. A sizing instrument for head measurement with instructions for its use comes in the box with each new APH-5 helmet along with instructions for correct fitting. More detailed instructions are in BuAer Aviation Clothing and Survival Equipment Bulletin 5-57, Subject: Helmet, Protective, Pilots'—Type APH-5. Squadron parachute riggers and station publications offices should have copies of this BACSEB.

On the subject of helmet comfort, BACSEB 5-57 states: "If a thick liner is used in the area affected, substitute a liner of lesser thickness. If the pressure point remains, choose next largest helmet size and use thick liners in the unaffected areas and a thin liner in the affected area. In the area of the ear, if a tighter fit is desired, the four shims provided with each helmet assembly may be used. By removing the screw from the earcup assembly, the shims may be positioned between the earcup and the shell. Shims should be added until the desired increased snugness of the earcup assembly is attained. When shims are added, the removed screw should be replaced by the one-half inch screw contained in the package."

Expect the Unexpected

"ON TOUCHDOWN the nose bounced up and the aircraft started to porpoise," the copilot of a P2V-4 said. "We went through approximately three bounces when there was a crash from the left side of the cockpit and something was in my lap."

The something in his lap was a 38" section of propeller blade.

As the nosewheel tire had come off, it had struck the left prop breaking off a section which ripped through the cabin just behind the pilot's head. The tip of the prop struck the left side of his APH-5 helmet. If the pilot had not been wearing his helmet the blow could

have killed him. After striking the pilot's right shoulder the prop section came to rest in the copilot's lap.

The pilot sustained a broken shoulder blade; the copilot suffered a laceration of the right thigh where the prop struck him above the knee. Sitting on the pull-down seat behind the pilot and copilot, the plane captain sustained a laceration of the left hand where the prop struck him and lacerations of the neck and face from fragments of metal and glass.

HSS Ditching Tip

WHEN an HSS-1 completes an emergency autorotation in a ditching, the collective pitch lever moves violently up and down at will as the blades hit the water if the rotor brake has not stopped them first. As the blades stop, they tend to force the collective pitch lever down. If the copilot moves toward the port side of the cockpit before the aircraft has settled, his leg can be pinned between the seat and the collective pitch lever. This happened in an HSS-1 ditching some months ago—fortunately, the results were not fatal.

On ditching, the aircraft rolled to the starboard, nose down. With the starboard window under water, the pilot and copilot elected to evacuate through the copilot's window on the port side. They experienced some difficulty with the window which was partially open. The pilot got out easily, but the copilot's leg was pinned by the collective pitch lever. By this time the aircraft was completely submerged.

The pilot stayed down as long as he could to try to free the copilot but finally had to surface for air. The copilot continued to work at his leg and "somehow" in his desperation he succeeded in getting free. When the pilot swam back down, he met the copilot coming up. Both men surfaced and were rescued shortly afterwards by a fishing boat.

The copilot suffered severe contusions and abrasions of the thigh and leg.

Whenever an HSS-1 is about to hit the water, the copilot should try to keep his legs clear of the collective pitch lever. With his feet flat on the floor and his knees together, he should brace himself for the impact.

A second point brought out by this incident is that windows in operating helicopters should either be in the "locked open" detent or "locked closed" detent. A window left halfway open can be dangerous.

Sealing the PSK-2

RESCUED from the water after a controlled ditching of an AD-6, the pilot found that one container of his PSK-2 kit had leaked and its contents were soaked. Fortunately, this pilot was picked up shortly after the accident. Under more difficult survival circumstances, his leaking PSK-2 container could have been disastrous.

If the sealing tape on both containers of *your* PSK-2 kit does not seem tight, reinforce it with additional wide waterproof tape.

You don't leave any of your equipment behind on your vacation, how about your flight?

Unmasked

IN HIS report on a landing accident involving an F3H-2M, the flight surgeon comments on a finding which in his opinion did not bear directly on the accident but is worthy of mention.

The pilot was not wearing his oxygen mask at the time of the accident; he had removed it at 4000 feet to take a smoke and had not replaced it for the landing phase.

OpNav Instruction 3710.7A, Section VI-3 states in part: "Oxygen shall be used by pilots and crewmembers of jet aircraft from takeoff to landing. Emergency oxygen bailout bottles, where provided, shall be connected prior to takeoff."

Attention Getter

WHEN you take off into the wild blue you never know where you may land—take the case of the F11F-1 pilot who ejected over Mission Bay after hydraulic failure. In spite of everything the pilot could do, his chute drifted over the San Diego Freeway. He saw he was going to land at the Washington Bridge intersection of Highways 101 and 80. The time was approximately 7:45 P.M. Traffic was heavy. To attract attention, the pilot took off his oxygen mask and threw it at one of the cars. The driver of a convertible saw him, pulled to a stop and held up traffic as he landed gently just in front of the car. ●

EXPOSURE TO RADAR WAVES

by

Charles I. Barron, MD,

Medical Director,
Lockheed California Division

Courtesy of Lockheed Aircraft Corp.
"Field Service Digest."

WE LIVE in an age of man-made phenomena. Stories of rockets, satellites, atomic energy, and electronic marvels fill our newspapers. These scientific advances are so new to most of us that it is easy to feel there is an element of the supernatural about them. In this atmosphere of miracles and mystery, a few reports and rumors of fearsome side effects on persons exposed to radar beams have more than once found an interested audience.

Carefully controlled experiments and studies have been made over a period of several years to detect any possible harmful effects upon personnel working with or near high powered airborne radar.

The news from these medical studies is good. This does not mean that there is no potential danger from high powered radar beams. Medical experiments with test animals have established that a hazard may exist under certain conditions. But, proper precautions can prevent adverse effects just as they do in other potentially dangerous situations.

Let us first briefly review the radar wave itself. Then we will examine the findings from controlled medical tests and from the surveilance of persons working with airborne radar. General safety precautions, from both the physiological and physical standpoints will also be discussed.

The Radar Beam

What it is: Radar waves originate as electronmagnetic impulses in a high frequency oscillator tube called the magnetron. These impulses are generally referred to as microwaves, because of their relatively short wave length. They are carried through a wave guide to a transmitting antenna which projects the waves into space at the speed of light. Upon striking an object in space which they cannot penetrate, the waves are reflected back to the antenna and wave guide. These reflected waves are similar in frequency and wave length, but of considerably less power than the original projected waves. A receiver translates the reflected wave into the visual presentation of range and bearing that appears on the radar screen.

How it affects us: Airborne radar equipment employs several different wave lengths. S-band radiation, in current use for general search and AEW (Airborne Early Warning), contains the longer wave lengths (10.4cm) and operates at very high power. The X- and C-bands are the shorter wave lengths (3.2 cm and 5.5 cm respectively) and are used for weather radars and height finders. Both X- and C-band employ relatively low power transmitters.

The biological effects of radar are to a great extent associated with the radar's frequency and wave length as well as its average field intensity (power). It is the nature of the microwave

radiation that the shorter X- and C-band wave lengths cause maximum heating effects at skin level, where it will be most easily felt and dissipated. On the other hand, the longer wave lengths induce greater heating in tissue beneath the skin. For example, maximum heating to body tissue occurs at approximately one-half to three-quarters inch below the surface of the skin when exposed to 10 cm S-band radiations.

This type of exposure may be especially undesirable in that a high degree of heat is created below the nerve endings that generally serve as heat detectors. It is consequently possible for this type of radiation to produce relatively high heat levels in the body without any warning to the person exposed. This situation is difficult to understand. However, as an analogy, it is true that if a slab of butter approximately three-quarters inch thick was placed upon a cut of beef and then exposed to S-band radar, the butter would first melt at the butter and meat junction, rather than at the top level of the butter as one might expect.

Heating effect: The consensus among military and civilian medical investigators is that the primary danger to the body from radar radiation is due to the heating effect. Injury does not occur instantaneously, but must be applied for various periods of time and at certain intensities of power. There is essentially no radiation danger from the reflected wave, since this is greatly reduced in power at the time of visual display. Radar equipped aircraft in flight offer no hazards to the flight crews as the radar waves are usually absorbed or reflected by the shielding of the transmitters. At the present time, there is certainly no reason for people on the ground to fear exposure from aircraft flying overhead.

Medical Studies and Findings

General: Experiments to determine the effects of radar waves were conducted on small furry test animals some time ago. These tests first revealed the potential dangers of radiation. They were highly publicized and gained the attention of a great number of people—doctors and laymen alike. The results of these studies do not necessarily apply to human beings for several important reasons.

For example, small furry animals do not possess a very efficient heat regulating mechanism and it is fairly easy under certain test conditions to elevate their body temperature to a critical point. This is especially true in experiments where the animals are anesthetized and do not feel any heat. The experiments on most animals have been conducted in the confines of wave guides which reflect and trap heat and act much like an oven.

Man, on the other hand, is a relatively large subject with the most effective heat regulating and air conditioning system of any creature on earth. Consequently, he can resist the effects of transmitted heat much more efficiently. Also man is normally exposed to airborne radar while working in open areas, where it is easy to lose body heat to the surrounding cooler air.

Another difference between experiments with animals and human exposure is that the animals were exposed to a stationary radar beam, whereas most humans are exposed to beams transmitted from rotating antennas. This gave the person exposed to the heat effects of radar a chance to transmit or lose heat to the surrounding air between exposure intervals.

Radar Personnel: To initiate our medical studies, we conducted complete physical examinations on 226 radar personnel. The majority of personnel examined had been working with high powered military search-type radar. These subjects had histories of radar contact varying from occasional beam exposure to an exposure of four hours a day and up to thirteen years of over all contact prior to and during employment at Lockheed. Eighty-eight control subjects who had no known exposure to radar were given similar examinations for comparison purposes.

Extent of Tests: The examinations included extensive questioning concerning their health and medical history. Emphasis was placed on examinations of the eyes, central nervous system, stomach and digestive system, reproductive system, liver, and skin. A study was also made on the effects of any embedded metallic foreign substances (implants) such as bullets, steel fragments and steel bone pins.

Blood counts, urinalysis, chest X-rays and other routine laboratory procedures were accomplished. In addition, other

Continued from preceding page

studies capable of detecting temporary or permanent body changes due to heating were conducted. These included tests similar to those performed on experimental animals which had been subjected to damaging effects of radar waves. Each employee was also carefully questioned in regard to his marital and fertility history.

Results of Tests: Without describing the individual findings of each of these medical examinations, we can say that the people in the radar group showed no significant differences from those in the control group. There was absolutely no evidence of any temporary or permanent body changes or injury that could be attributed to radar waves.

As a matter of incidental interest the radar personnel examined had a greater number of children per family on the average than the control group. These children revealed the normal mental and physical development expected for their age group.

Re-examination of over 200 of the subjects in the radar group nine months after the initial study and again a year later, revealed no indication or evidence of damage to the eyes, body organs, or skin that could be attributed to radar radiation. A small incidence of the usual type of diseases was detected during the examinations. However, this is to be expected during the course of any complete physical examination program. They were similar to the common garden variety of disorders that affect the average person from time to time.

Summary of Studies: The detailed medical studies conducted so far have not revealed any significant changes in personnel who work with airborne radar. It is known, however, that powerful radar wave emissions do produce a heating effect on the body. To guarantee the safety of persons who work with airborne radar, additional and extensive medical research is continuing in military and civilian research centers. In the meantime, high power radar transmitters are to be treated with full respect and in accordance with the necessary precautions described below.

Safety Precautions

Man's awareness of the potential danger of high powered radar has led him to put into effect certain safety precautions to minimize the hazards of radiation. This is similar to the manner in which he takes precautions to avoid excessive exposure to many other types of hazards such as noxious fumes, overheating by direct exposure to the sun, fire, and so forth.

Two Ways To Be Careful: Our discussion on safety precautions is in two parts: The first part deals with the health hazard of radiation—the heating effect of microwaves on the body; the second part concerns the physical hazards of radiation—the ability of the microwave to ignite combustible materials. Other hazards which are attendant with high voltages and radioactive electronic tubes are outside the scope of this article and will not be discussed here. However, personnel should be aware of the recommended precautions and observe them.

The safety precautions we recommended are necessarily of a general nature because of the great variations in hangar facilities and flight line setups among operators. Another important factor is the variety of airborne radar sets designed for different conditions and power outputs. Specific precautions for one radar installation might be out of proportion for the dangers involved with another type radar.

Each operator should weigh evidence of the type presented here and establish the most effective and the least cumbersome set of safety rules required by his particular circumstances.

Health Hazards of Radiation: The following are general precautions for personnel safety which apply to radar units of any strength:

1. Do not stand in or close to

a stationary radar beam.

2. Do not look directly at an operating antenna, especially when at close range.

3. Get away from an area of beam exposure when aware of increased body heat.

4. Do not operate the radar on the ground with the antenna pointed toward nearby occupied areas.

5. Do not operate the radar when passengers are being loaded or unloaded.

Physical Hazards of Radiation: The following results were obtained several years ago when we conducted tests with a standard high power airborne military radar. The beam was projected in one direction.

► Dry steel wool was ignited at a distance of 100 feet.

► An explosion was produced when aluminum chips in a gasoline vapor-air mixture ignited at a distance of 70 feet.

► Photo flash bulbs were fired at a distance of 323 feet.

► Audible and visible sparking was apparent when metallic chips were shaken in a paper bag at a distance of 330 feet.

Even more spectacular results have been obtained in more recent experiments of this type. However, it must be borne in mind that these phenomena were produced under prepared test conditions with high powered equipment. Under normal operating conditions, comparable results were not produced with the lower powered weather radar sets.

The military activities which use the high powered search radar are subject to specific precautions regarding refueling operations during ground test of the radar. These are outlined in the following publications:

a. BuAer Technical Order 24-55, "High Power Airborne Radar Equipment; Safety Precautions Concerning."

b. BuAer Technical Note 17-54, "Exposure to Beams of High Power Airborne Radar Equipment; Information Concerning."

c. Technical Order 31-1-511. "Radio Frequency Radiation Hazards."

d. In local regulations established by the activity.

Commercial operators who use weather radar should observe the standard precautions which apply to operation of electrical equipment during refueling operations. Areas where the radar will be operated should be kept free of trash and oily rags. Remember that the potential dangers of radiation are greatest when the beam is stationary.

In conclusion, our experience at Lockheed and that of the military services lead us to believe that repeated exposure to radar while observing proper precautions does not lead to any cumulative or chronic effects upon the body. There is also no real medical evidence to show that anyone has been seriously injured to date by working with radar equipment. Information published in newspapers and magazines within the past year concerning alleged injury has not been scientifically validated. In the opinion of most medical scientists, the disorders reported were not caused by radar. There is also no reason to believe that the increased incidence of heart disease, blood disease and cancer in the general population is in any way associated with the increased use of radar.

We should again point out that the medical tests and the experiments which produced the physical phenomena discussed above were conducted with radiation from high powered S-band radar. Proper safety precautions have been established which are effective in minimizing radiation hazards with this type equipment. This is confirmed by service experience as well as by the aforementioned medical examinations of radar personnel.

X- and C-band equipments used as commercial weather radar are generally of low power output and have poor penetration powers. Radiation hazard to personnel testing and servicing this type of equipment is less than from the S-band radar. This does not imply that they are without any potential risk.

As a general rule, observe all precautions established at your activity when working with any radar equipment. ●

"Oh heck, Kennedy, when you've seen one tiger you've seen them all."

COLUMBUS WAS HERE

At least it's believed that Columbus' first landfall in the New World was San Salvador Island. Four hundred sixty-six years later, when a P5M of VP-56 was forced to make a single engine night open-sea landing at San Salvador, all hands pitched in to make an engine change under Columbus-like conditions. A replacement engine was airlifted to the island, and VP-56 sent a rubber assault boat, supplies, mail (and paychecks) to the stranded crew. Logistic and muscle aid was provided by units of the Navy, USAF, Coast Guard, SeaBees, Pan American World Airways, and the local civil commissioner. And Mr. Sam Ferguson, a local fisherman who doubles as deacon on Sundays, skillfully piloted the taxiing seaplane for 4½ hours through treacherous coral reefs into a safe anchorage for the subsequent engine change.

Pilot of the P5M was Cdr. J. A. Jones, then XO and now CO of the squadron; Lt. (jg) M. M. McCune was copilot and navigator was Lt. (jg) A. A. Tisdale. After losing the starboard engine Cdr. Jones had to operate the good one at 2900 rpm, 52" for 2½ hours to make San Salvador; they were intercepted and escorted by a USCG UF-1 which was airborne just four minutes after their first distress call. The UF dropped paraflares for the landing.

With rapidly changing and threatening weather it was necessary to work fast, and all aid given was expedited with this in mind . . . oil was obtained quickly by a telephone call to Patrick AFB. Seabees provided crane service and Navy Public Works personnel constructed a raft—which now serves as a recreational swimming raft for base personnel. The assault boat proved most valuable as a water taxi and for towing and utility duties, and is highly recommended by the squadron. Fuel, anchors and buoys were provided by the Submarine USS GUAVINA.

The entire operation occupied 12 days, although several days were denied by bad weather. Quoting from the CO's report, " . . . preparation is the one essential ingredient in the recipe. The actual mechanical changing of the engine from dropping the prop to the blow-out start required only about two working days. This would not be considered bad in a hangar ashore. But this was preceded by six days of painstaking preparations. It is the thoroughness with which the preparations are made which will control the degree of success, reliability and safety of the final maintenance product."

Congratulations and thanks to all who worked and aided in restoring a unit of the fleet to duty. With all his resourcefulness and skill, we wonder whether Columbus would have done nearly as well.

The raft was anchored upwind of the aircraft and eased into place by paying out anchor line; mattresses served as fenders. Delicate juggling of sandbags on wing was required to maintain even keel during engine transfer. Aircraft taxied to opposite side of island on one engine to reach only suitable sheltered water.

"Run 'er up . . . " Ten days after hazardous landing newly installed engine was started using blowout plugs, two hour taxi run-in was performed next day. Crew overcame many obstacles, had much support but changed their own engine without relief or additional manpower from squadron.

An LSM was offered, but would not have been able to squeeze beneath engine mount like the raft made by utilizing local fuel drums & lumber. Marine assault boat at left proved extremely valuable, took rough water well. Raft is now used for swimming, still available for its original purpose though.

Deceptively inviting beach was too shallow, too studded with coral to permit beaching of the P-boat. After being refueled at point of initial landing by USS GUAVINA, the aircraft was taxied around to the north end of the island, where an advance party had already sounded a safe channel, laid a sealane and anchored mooring buoys.

". . . if I am ever faced with similar circumstances again . . . I will take into account ditching and rescue probabilities prior to departing on an administrative flight over water in a single engine aircraft with passengers on board."—Pilot's statement, AAR

AND A RAFT

"WE HAD a ditching plan but we didn't have a survival plan. This could have cost us our lives."

That's the pilot of an AD-5 speaking. You'll hear more from him later.

Ten minutes after takeoff on an IFR flight over Chesapeake Bay there was an explosion in the engine. The aircraft was at an altitude of 2200′. Time: late afternoon. Weather: moderate turbulence, intermittent rain, poor visibility. Sea state: heavy, 10-12′ waves. Five persons were aboard.

The navigator immediately transmitted "*Mayday,*" informed Norfolk Departure Control of the situation and turned on IFF from standby to emergency. Notifying all hands to prepare for ditch-

Continued from preceding page

ing, the pilot began an instrument letdown and increased his rate of descent when the navigator reported fire on the starboard side of the engine.

Prepare for Water Landing

All hands checked their shoulder harnesses and prepared for a water landing. The aircraft broke out of the overcast at approximately 500′. The surface of the water became visible below. Gale winds churning up the waves were blowing foam off the tops of the whitecaps. The air temperature was 59° F. Water temperature was 64° F.

Both front canopies were opened and the rear hatch emergency jettison lever was actuated shortly before contact was made with the water.

The aircraft settled into the water at a speed of about 90 to 95 knots. The first impact was mild, the second moderate and the third severe. Both the pilot and the navigator grayed out momentarily during the second or third impact. The three passengers in the rear cockpit aft-facing seats experienced only mild to moderate jolts.

"Everybody out!" the pilot shouted.

Aircraft Settles Rapidly

The aircraft was settling rapidly. In the front cockpit the pilot and navigator released their safety belts and shoulder harnesses. The pilot started to unbuckle his chute pack, then decided to take it with him since it contained his pararaft. Just before the impact, one of the passengers in the rear cockpit had actuated the canopy emergency jettison handle. When the pilot got out of the cockpit, this same passenger was already out on the wing and checking to see if the other two passengers were all right. By now the wing was well awash. When the pilot accidentally slipped off the wing, he inflated his life vest and unpacked and inflated his pararaft.

"By this time, the tail of the airplane was starting under," the pilot reports, "but I had three people right with me and the fourth in sight so I knew everyone had gotten out. My raft served as a gathering point and within a minute after the plane sank, we were all together. No one was injured and everyone had a good life vest, but there was only my life raft for all of us."

Where Were the Other Four Rafts?

Five men and one pararaft . . . where were the other four?

- The navigator went back to retrieve his raft but was unable to do so as the plane was sinking too rapidly.
- When the passenger who had opened the rear cockpit and climbed out first checked his parachute pack on the wing, he found that there was no pararaft in it. He unbuckled his chest straps and threw the chute pack away.
- Later when the aircraft was salvaged, two parachutes were found in the plane. Both had envelopes for pararafts; the envelopes were latched but empty.

OpNav Instruction 3710.7A of 31 Dec 56 states, "Life rafts of sufficient capacity to accommodate the passengers and crew shall be provided in all aircraft when flights are made beyond gliding distance of land."

An AD-5 flying at an altitude of 2200′ (or even the authorized 4000′ to which the aircraft was climbing when it experienced engine failure) cannot glide to land from a point approximately in the middle of Chesapeake Bay.

"The water was extremely rough and quite cold," the pilot continues. "Even though we knew our position was well known, we were all plenty worried. We had a ditching plan which worked out but we did not have a survival plan—a fact which you will see later could have cost us our lives.

Difficult Just to Hang On

"Since we had no plan and it was extremely difficult even to hang on to the raft and keep from swallowing the bay, we allowed ourselves to be content with doing just that. We talked of swimming with the waves and even of trying to rig a sail from a chute floating nearby but gave up both ideas as impractical. The most important thing, however, we did not do—namely, take immediate stock of all signaling devices and survival gear and check everyone in the party out on their use.

"The only thing we had planned by this time was to set up a rotation plan to put one man in the raft for a given period while the rest of us

hung on to the raft around the sides."

Dusk was approaching . . . there were high seas . . . visibility was extremely poor.

Spot Smoke and Ship's Mast

"About 20 minutes after ditching, we saw smoke and a ship mast well to our east. We expended two daysmoke signals to no avail. Although I knew better, I casually tossed my flare away after using the daysmoke end, forgetting the night flare I might soon need desperately. LT B____, one of the passengers, was quick to call this error . . . it was not repeated.

Darkness Descends

Soon it began to get dark. The men were all very cold and somewhat tired. They began to get leg cramps.

"Although it had taken us some time to fire the first of the two smoke signals we still did nothing to be prepared for immediate action in the future nor had I even yet attempted to get my emergency walkie-talkie ready for use—all we could think about was hanging on.

"None of us stopped to realize that if a plane did come in sight, it would only be visible a short time due to the weather and we, therefore, must be instantly ready to signal it. This lack of foresight could have cost us our lives because a UF did come very close to us but we were far from prepared for it. When we first sighted the plane we were in its 11 o'clock position at about one-half to three-quarters of a mile. One of the passengers who had not been checked out on how to use the flares was in the raft and we told him to fire a daysmoke signal.

Signal Fired too Late

"When I saw he could not fire it, I immediately grabbed it and fired it but by this time we were in the plane's 9 o'clock position and the one daysmoke signal did not do the trick. If we had been ready with both a night flare and a daysmoke signal, plus the walkie-talkie, I feel we would have had a 90 percent chance of being spotted by this plane.

"This sad exhibition jolted us into action and we now did what we should have done immediately after getting together. We took stock of all our survival gear and signaling devices and checked all hands out in their use including the walkie-talkie which I now got out. It was now the duty of the man in the raft to have a signal flare in his hand and I kept the walkie-talkie ready. I did try to get a signal out by walkie-talkie and planned to transmit a tone every hour."

Four of the men were wearing summer flight suits. The passenger without a flight suit had a foul weather jacket on. Both the pilot and navigator were wearing intermediate flight jackets. Four of the men retained their helmets. The fifth man, one of the passengers, had thrown his helmet away in irritation shortly after leaving the sinking aircraft when he thought the helmet chin-strap was cutting his chin. Later he realized his mistake when he needed the helmet to keep his head and ears warm.

"We impressed on everyone the importance of staying together. We planned to use the sea anchor line to tie ourselves together and I was to keep the life raft lanyard hooked to my life vest but before we put this plan into effect, we saw the searchlight of a ship on the horizon. LT B____ who was in the raft at this time immediately fired a night flare. As it started to die out we lit another, then a third. By this time the ship appeared to be coming our way and we decided to hold off another flare until the ship was a little closer. In the meantime, I changed places with LT B____ and knelt down in the raft while the others in the water steadied it . . . I was the only one with an operating flashlight on my life vest."

Every MkII life vest should have an operating flashlight securely attached. A careful preflight of all survival equipment on the life vest is an absolute necessity to insure that every item is in its place, properly secured and in good working order.

The skipper of an oncoming vessel (a Coast Guard tug) saw the flares, then located the life raft and the five men by the flashlight beam. With its searchlight focused on the raft, the tug approached to make the rescue. The first attempt was a miss because of the sea state and varying rates of drift. On the second approach, the tug

Continued from preceding page

came close enough to heave life rings on lines to the men in the water. Three of the men were pulled aboard with life rings in spite of the heavy seas and pitching ship although one of the men was dropped back into the water twice. When the navigator was dropped back into the water after almost being pulled on board, he elected to return to the raft with the fifth man. They were immediately picked up from the raft by an approaching Coast Guard cutter which had a scramble net rigged over the side.

The men had been in the water for two hours.

Pilot Makes Recommendations

Among the pilot's recommendations are:

► Dye pararaft container and parachute harness and pack bright orange. The parachutes floated in heavy seas for over an hour, bottom up with the harnesses trailing on the surface, he said. Since they had a different drift rate from the pararaft they moved away from the survivors thereby enlarging the area of probable sighting.

► Paint helmets a high visibility orange. If they are lost they float and will attract attention.

► Do not discard helmets. In a survival situation such as this they have three advantages: 1) head warmth; 2) protection for eyes against salt spray; and 3) head protection as the wearer is pulled up the side of the rescue ship.

► Searchlight operators on search vessels should blink light a certain number of times on sighting survivors' flares to encourage survivors and perhaps help them conserve their remaining signal flares until the ship moves closer where they might be of more value.

► Men handling life ring lines should not start hauling a line in as soon as a survivor reaches it but give the survivor time to slip a leg through the ring and grasp the line securely.

► Formulate your survival plan ahead of time and be prepared.

► Don't give up hope.

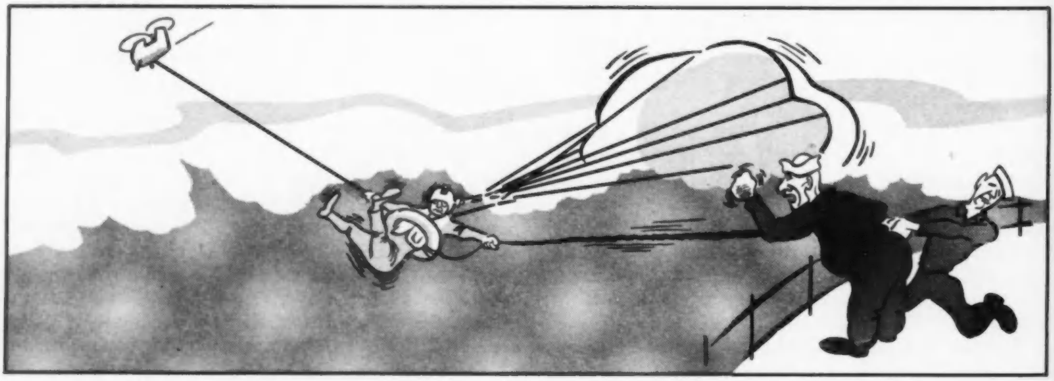
". . . it is recommended that all activities comply with OpNavInst 3710.7A concerning life raft requirements during over-water flights. The Board recommends consideration be given to the use of high visibility colors on all survival equipment and helmets."

—AAR

"Concur with the recommendation concerning life rafts. In the future all flights in tidewater areas will be considered to be potentially beyond gliding distance of land and life rafts will be carried for all hands. Concur with the recommendation concerning high visibility colors on all survival equipment and helmets."

—First Endorsement

Second and third endorsers . . . "forwarded . . . concur."



"We saw him first!"

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WHO IS GEORGE ?

He *isn't* the plane captain on his way to lunch who said George, the sweeper, would get that bolt before some jet swallowed it.

He *isn't* the off-duty pilot at dusk who said George, in the tower, would tell that guy taxiing out that his wings were still folded.

He *isn't* the pilot whose roommate confided to be imagining children's faces on his plane wings, but thought George, the doc, would find out.

He *isn't* the basic flight instructor who thought, "this guy's too scared to make a pilot, but I'll let George, the advance instructor, wash him out."

He *isn't* the wingtip man who thought, "that's too close, but George, the taxi director is supposed to look out."

He *isn't* the supply officer who said, "Sorry, no helmets available. George, up at the supply depot, hasn't sent any down yet."

He *isn't* the flight surgeon who noted the worn-out mask, but said, George, the safety officer will speak to the pilot about that. Nor is he the safety officer who saw the same mask and figured that George (the F. S.) would speak to the pilot about a new mask.

Safety isn't just George's job. It's everyone's. The safety officer, supply officer, flight surgeon, every pilot, crewman and mech.

Any of those people who saw a man stuck on a railroad track would risk their life to save him, but when it comes to a "minor" safety detail, they all said, "Let George do it."

Let's take a look at the fellow who does say, "let George do it." . . . More often its subtly phrased: "That's George's job." "George will do it."

The man who says it may be a pilot, mech, or crewman. He may be in a flying billet, doing maintenance, issuing supplies, or behind a desk in a bureau.

He might be lazy, but more likely he is very busy with a dozen duties, a dozen projects due yesterday, and this month's flight time still to get. He may consider "it" next to impossible, (but someone must work at it, and George won't). He may assume, honestly, but carelessly, that George *will* do it.

He is probably all of us, upon occasion. Have you never said, "Let George do it, he's got more time."? "Let George do it, that's his job."?

Maybe it *is* George's job. Fine. But if you see something that *you know* needs to be done, try to make sure it *will* be done. You *may* be the first one who noticed it; you may be the only one.

If it's George's job, talk to him and make sure that he agrees it's his job, before you drop the whole thing. George works automatically only when he's the automatic pilot, not when he's as human as you are.

Maybe he thinks it isn't his job. Sometime try saying, "Let me do it" or "Let's both work on it." Take a human interest in the other guy's problem. He'll reciprocate, you'll be doing your job better, whatever it is, and it might improve squadron morale a bit.

Look out for "Let George do it." George is a great big accident factor. George is a malingerer, a gold brick, who *doesn't do* the jobs so freely passed to him.

George can even be *you*, when the other guy says, "Let George do it."

George is too often the little man who isn't there at all.

Speak up, and live!

The process of sophisticating our aircraft has introduced mechanical complexities challenging even the sharpest of mechanics, and, some new mistakes are expected to be made. But, here's an old mistake which continues to occur simply because we are too often guilty of

SPARING

Five aircraft recently experienced common failures: Two resulted in strikes and three managed to return to base without major damage. All failed to complete their missions for essentially the same cause. The aircraft: An AD-6, FJ-3, HUS-1, two P5Ms; here's what happened on each of the flights:

Flight No. 1. An AD-6 taking off from NAS on a local test flight reached 1000 feet when its engine stopped. The pilot in an effort to reach the takeoff runway made a turn downwind and attempted to restart the engine. Seeing he could not reach the field the pilot ditched the airplane and escaped without injury. The airplane sank within a half minute. Salt water damage resulting from the aircraft being submerged for 6 days dictated that it be stricken, though otherwise it was not severely damaged.

Flight No. 2. The FJ-3 had just come from a 120-hour check and was being test flown. At an altitude of 24,000 feet while checking the fuel flow at 100% power, the RPM suddenly reduced to IDLE. The pilot immediately switched to the manual fuel control with no effect other than the normal small increase in RPM accompanying this change.

The tower was advised of the difficulty and the possibility of ejection was discussed if the pilot was unable to establish visual contact with the field or the distance was too great to reach it. Upon descending to 6000 feet through a break in the clouds, the pilot saw the field well within gliding range of the aircraft.

Approximately 4500 feet after touchdown, the starboard tire blew and the aircraft began veering slightly to the left. The aircraft continued on a track 15 degrees to the left of the runway heading and the port tire blew approximately 5000 feet after touchdown and immediately prior to the aircraft leaving the runway. The aircraft continued off the port side of the runway and the port wheel rolled over the concrete base supporting a runway light and came to a halt 60 feet after leaving the runway. The starboard brake was burning and was extinguished by the crash crew.

THE ROD

Flight No. 3, HUS-1—After a ship to shore flight in which 10 troops were off-loaded a takeoff was made in the direction of the carrier. Upon adding power to join up on his flight leader the pilot discovered he had no throttle control, and, after declaring an emergency turned back toward the runway. The aircraft crashed 445 feet from the approach end of the runway.

The primary cause of the accident, according to the accident board, was the fact that the pilot was relatively inexperienced and had suffered three distinct shocks in rapid succession which were panic-producing in effect: 1, when he first lost throttle control; 2, when he lost rotor RPM on initiating autorotation; 3, when he overflared and began an alarming fast rate of descent.

The accident board also found a concurrent cause factor. For this story please see Flight No. 3 on the next page.

Flight No. 4, P5M-1—The starboard engine failed with no prior indication of trouble, rough running or backfiring. Military power was immediately applied. A check of instruments and fuel panel revealed no apparent reason for engine failure, so the engine was feathered. Altitude could not be maintained with MRP. Jettison of fuel was begun and the aircraft descended to approximately 300 feet. Priority No. 1 gear was then thrown out followed by other equipment. Military Rated Power was retained for a period of 23 minutes. Power was then gradually reduced. After 1 hour and 30 minutes of flying above Normal Rated Power, it was possible to retain altitude and airspeed at Normal Rated Power. Return to base took 1 hour and 45 minutes.

Flight No. 5, P5M-1—About 3 miles from the mainland the manifold pressure on starboard engine commenced a gradual increase which was initially controlled by retarding throttle. However, with throttle fully closed increase continued until manifold pressure of 40" was reached at which time the engine was secured and the prop feathered. Single-engine procedures were initiated and the aircraft returned to base without further incident.

Continued next page

SPARING THE ROD

Continued from preceding page

How and why did the foregoing happen? The following offers some preventives. Can you improve upon these?

Flight No. 1. AD-6—The test flight had followed a carburetor change. Upon salvage of the AD, investigation revealed that the throttle linkage connecting the MAP regulator was not secured at the MAP regular end (Photo at right). Further inspection revealed the bolt nut and two washers lodged in the bottom cowling. No cotter pin was found.

Two qualified inspectors were assigned to the inspection section but on this day they were being utilized as crewleaders away from the base. The carburetor change was signed off as having been inspected by the check crew leader doing the work.

The AAR Board recommended that an adequate number of qualified men be assigned as inspectors and that no check or other work be signed off by other than qualified inspectors.

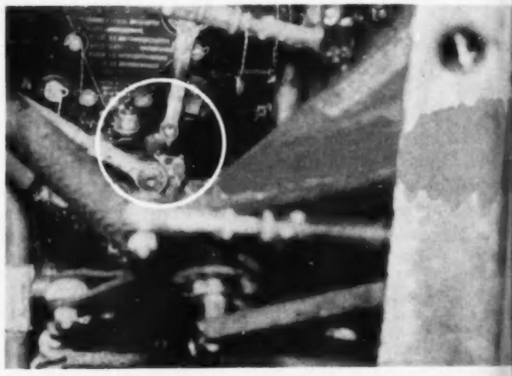
Flight No. 2. FJ-3 — The metal, self-locking nut came off the power lever connecting bolt allowing the power lever connecting bolt to slip from the fuel control pilot lever (see photo at right). This severed the throttle linkage continuity and rendered the throttle useless. Due to the spring-loaded governor in the fuel control unit, the power immediately went to the idle position.

The Board was unable to determine the reason for the nut coming off the power lever connecting bolt. The aircraft was airborne approximately 40 minutes prior to any malfunction and it is believed this nut was in place at the beginning of the flight. Therefore, either the bolt was only finger-tight, or the self-locking characteristics failed through re-usage of the nut.

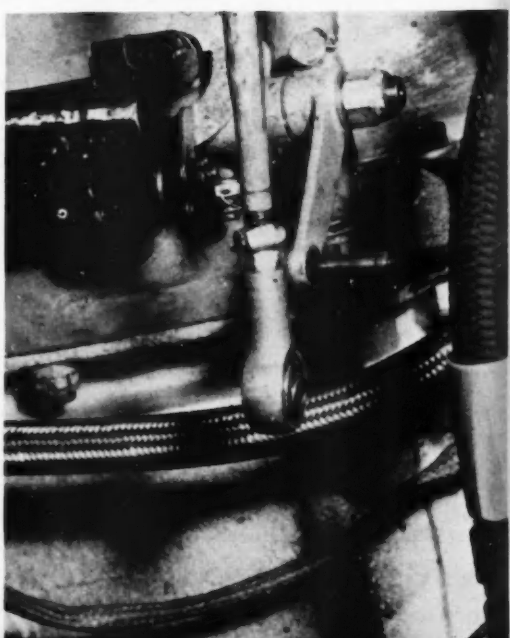
These nuts were changed on all FJ aircraft. The aircraft maintenance officer re-emphasized to all maintenance personnel the importance of proper torquing as well as the correct usage of the various types of self-locking nuts.

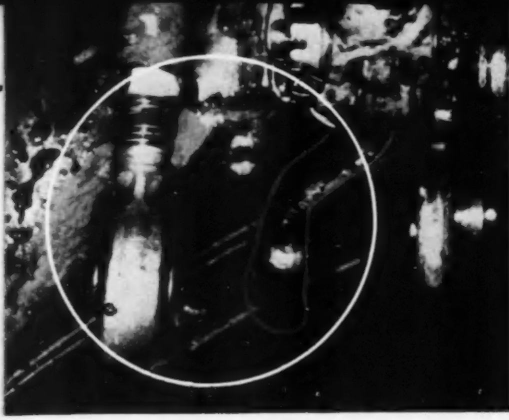
Flight No. 3. HUS-1—The loss of throttle control was due to the absence of the bolt and nut connecting rod Part No. S1630-80803 to lever Part No. P70248 as shown in the photo at right.

Investigation into the cause of the missing nut and bolt revealed the nut in question to be of the self-locking type when properly torqued. The nut may lose its self-locking quality when removed after use of one or more times. The nut and bolt were seen



Throttle linkages disconnected in flight: Above — cotter pin was missing. Below and upper right—self-locking nuts came off.





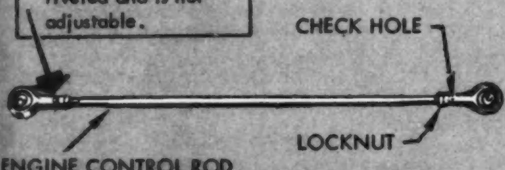
to be in place prior to the first flight of the day. Neither bolt nor nut were found in place on the crashed aircraft.

No evidence was found to indicate the bolt had sheared.

It was recommended that the nut and bolt in this case be replaced with a drilled bolt, castellated nut and safetied by use of a cotter pin.

ENGINE CONTROL ROD ADJUSTMENT

NOTE: This end is riveted and is not adjustable.



THE ROD END ADJUSTMENT NOTES LISTED BELOW ARE TYPICAL FOR MOST ROD END DESIGNS. STRICT COMPLIANCE WITH THIS INFORMATION IS NECESSARY TO ENSURE SAFETY OF FLIGHT.

- If the rod end is removed, be especially careful not to cross-thread the rod and rod end during assembly.
- After adjusting rod end, make sure that threads on end of rod are visible through check hole. Thread engagement must be such that a piece of safety wire cannot be inserted through the hole.
- Be sure to secure locknut firmly after completing adjustment.

NOTE: 100 - 140 INCH-POUNDS TORQUE ON LOCKNUT.

Flight No. 4. P5M-1—The throttle rod assembly became disengaged at the engine control bracket assembly when the bolt vibrated loose. The cotter pin, which safeties the clevis bolt nut and the nut were both missing from the aircraft when post-flight inspection was conducted.

Investigation revealed that the starboard carburetor throttle valves were in the idle position after the throttle rod assembly was disengaged. Disengaging the rod assembly-throttle on several carburetors, incorporating the throttle balancing spring, resulted in the throttle valves going to FULL OPEN; however, when this procedure was followed on this starboard engine of this aircraft, the throttle again went to the IDLE position when the engine was started indicating that the balance spring was not properly tensioned. Measurement revealed that a torque of only 14 in. lbs. was required to unbalance the spring and close the throttle. Increasing the tension to 26 in. lbs. resulted in the engine producing the following power with the rod assembly-throttle disconnected. MAP 27.9 in Hg, Torque 61 psi, RPM 2100.

A more thorough and searching post-check and post-flight inspection was recommended by the reporting unit.

Flight No. 5. P5M-1—The check-nut on the throttle rod assembly backed off permitting the rod assembly to rotate at the quick-disconnect end, unscrewing the check-nut from the assembly and dropping free.

Although it is possible that the check-nut could work loose in flight, the fact that the subject failure occurred on a test flight subsequent to an engine change indicates that the fire-wall end of the throttle rod assembly was not properly inspected at the time the engine was installed.

The corrective actions suggested by the accident boards are summarized as follows:

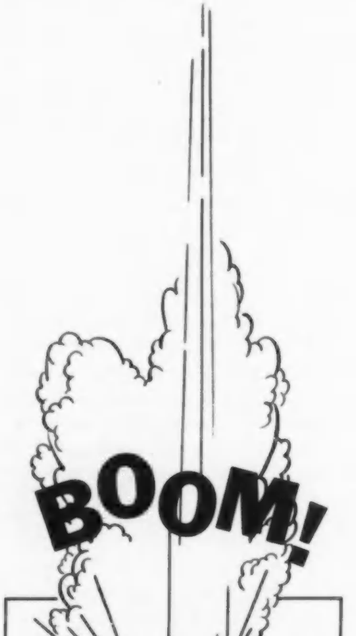
Assign qualified inspectors to check all work performed on throttle control units for:

1. proper type nut, bolt and locking feature (cotter pin or self-lock)
2. proper torquing of linkage nuts *(note illustration, left).*
3. proper operation of "fail safe" features.

In short, when it comes to inspection of engine controls—DON'T spare the throttle connecting rod.

Note: According to BuAer, Military Standard 33588 on Functional Limitations of Self-Locking Nuts, dated March 1957, can be misinterpreted to allow self-locking nuts on certain engine controls. A forthcoming revision will clarify future usage. ●

FIRE ONLY WHEN READY



A MECHANIC in the process of removing the canopy from an A4D-1 was disassembling the wire leads that join the ejection seat face curtain to the canopy ejection firing mechanism. He accidentally tripped the trigger mechanism which fires the canopy ejection bungee cylinder. The bungee cylinder fired, and since the canopy was already open, sheared from its connecting rods, struck the mechanic in the face and continued on through the top of the canopy. The canopy then fell and broke the man's right arm.

Investigation of this ground accident revealed the following:

The mechanic neglected to vent the 2500 psi air pressure from the canopy ejection bungee cylinder. This is the first step in the maintenance procedure for removal of the canopy.

He was well aware of the proper procedure to be followed in removing the canopy and had attended numerous lectures on the subject. Prior to this accident he had removed a number of canopies from A4Ds. His officer-in-charge feels that he is a well qualified mechanic.

Why the mechanic overlooked this most important and first step in the required procedures is not known.

All the maintenance personnel of the reporting unit have again been reschooled—on the proper procedures for removal of the A4D-1 canopy. In addition, general safety precautions to be observed when performing maintenance on the many potentially dangerous devices on the A4D are being restressed to all personnel.

UNSAFE SAFETY LOCK—The plane captain was helping the pilot strap into an A4D-1 prior to starting the engine. While removing the canopy enclosure bungee safety lock, the bungee cylinder fired.

The canopy flew open, the cylinder piston separated and was thrown about 20 feet forward of the aircraft. As the piston separated, it struck the plane captain's left forearm and inflicted two fractures. The canopy did not separate from the aircraft, but was thrown open and rebounded, striking and bruising the plane captain's right forearm. The pilot, uninjured, lifted the canopy and assisted the injured man.

The most serious of the several factors contributing to this accident was the fact that the safety lock had been improperly installed. This condition made it possible for the cylinder to fire when incorrect procedures were used to remove the lock. Even though the acting plane captain knew the correct procedure, he did not fully understand the purpose of the pin nor appreciate the danger involved in handling the bungee cylinder improperly.

The inaccessability of the bungee and safety lock is considered to have contributed to the accident. The removal of the safety lock is an extremely awkward procedure, and it is difficult for the individual to see what he is doing.

The non-standardization of bungee cylinders and safety locks causes each of the various assemblies to be handled differently. The reporting squadron had two types of bungee cylinders, and was using four different safety locks. A situation such as this is confusing to personnel handling the equipment.

The safety lock that was concerned in this accident was of an old type that could be installed incorrectly (inverted), thereby providing no measure to prevent inadvertent firing of the Bungee. This situation was corrected by a redesigned Part No. (K-4663820); however, the reporting squadron did not have any of these.

The improved pin type safety locks were reordered in an effort to standardize the locking equipment. It was recommended that the old lock P/N (K-4546444) be made obsolete and the new type P/N (K-4663280) be distributed to all activities operating A4D aircraft with the old cylinder.

The squadron involved is evaluating the procedure of reinstalling bungee safety locks after each flight, as this practice could possibly increase the probability of handling errors by having personnel working with bungee cylinders more often than is necessary. It was considered that installation of the locks only when securing the aircraft at the end of the flying day might be a more practicable solution.

DON'T HIT THE SEALING — In government-furnished batteries (AN3151-2) repeated cracking of the sealing compound has occurred around the edges of the battery cells. These cracks are of various lengths and depths, and appear to be caused by environmental conditions, as they are found in new "stored," as well as in used batteries.

Repeated cracking after resealing can result from mishandling, dropping, or recharging with too high an amperage over too long a period of time. Here are some tips that will help eliminate the sealing compound cracking problem in batteries at your base:

Clean sealing compound in AN3151-2 batteries periodically with household ammonia and reseal to prevent seepage of the electrolyte.

Use care in handling batteries. You'll find information about this in TO 8D2-1-31.

Limit charging rate for AN3151-2 batteries to one ampere.

Check temperature at which batteries at your base are stored. Recommended temperature range for batteries in storage is 35°F to 80°F. Batteries should be stored in as cool a location as possible within these limits.—*NAA "Operation & Service News"*

OIL SYSTEM INSPECTION—It was recommended that the oil system of all overhauled engines be thoroughly inspected for metal contamination prior to installation on aircraft. The necessity for this was recently proven when an overhauled engine was found to have particles of metal in the oil system prior to installation on a P2V. In this case, good inspection procedures prevented what could have been an in-flight failure and possible accident.—Iwakuni

REMOVAL OF SPILLED KEROSENE FROM RAMPS —The slow rate of evaporation of kerosene dictates a new method of cleaning up after fuel spills. One method found satisfactory is to spray the spill area with diluted emulsion cleaner and then flush with water.

The common aircraft emulsion cleaner is a mixture of a wetting agent and soap plus a coupling agent. The coupling agent acts to unite the soap with any petroleum product. Usually the emulsion cleaner is packaged in concentrated form and can be diluted with standard solvent as much as 8 to 1.

When the spilled fuel with its covering film of

Continued from preceding page

diluted cleaner is hosed off the ramp, the water immediately combines with it to form a soapy emulsion. This mixture is not flammable.—*Aviation Mechanics Bulletin, FSF*

FUEL SYSTEMS CHECK — An FJ aircraft was scheduled for test flight following second intermediate check and engine change. After thorough preflight, the aircraft was started and taxied to the run-up area where a manual and primary fuel control check was made. The aircraft was cleared for takeoff, which was executed using 3000-3500 feet of runway. After becoming airborne, the pilot raised the landing gear. He then noticed a fire warning light and that the tachometer was unwinding. He informed tower personnel of intentions to abort takeoff, moved the fuel control lever to the off position, opened the speed brakes and made a wheels-up, flaps-down landing on the runway. Fire was observed under the right side of the aircraft. The pilot abandoned the aircraft, and the fire was extinguished by the crash crew.

The primary cause of this accident was due to maintenance error since the aft fuel boost pump outlet line bolt was not properly torqued and safety wired.

Secondary cause is attributed to supervisory personnel error in that the check crew leader failed to note the omission of a check for security of the fuel boost pump on the aircraft check sheet.

The partial power loss was a result of the throttle slipping back due to the friction lock being off.

Recommendations:

► That all boost and transfer pump installations be inspected to insure system integrity as described in the HMI.

► That all personnel working on aircraft constantly be instructed and reminded of the importance of inspecting installations and properly securing component parts of aircraft in accordance with existing instructions.

► That flight line personnel be instructed to observe aircraft for leaks or improperly secured items throughout the starting and taxiing phase.

► That pilots be reminded of the possibility of the throttle backing off with the throttle friction lock off.

► That pilots be reminded that when power loss is not accompanied by a fire warning light, the manual fuel system be selected.

► That aircraft designers devise a throttle linkage that will not move of its own accord from a pre-set position.

► That present throttle friction locks be adjusted to prevent throttle creep when such locks are in the full OFF position.

AVGAS HARMS PAINT—Recent reports indicate that a mixture of 115/145 aviation gasoline and JP-5 is being used for the cleaning of A3D, A4D and F4D aircraft. Use of this mixture on acrylic base paint is extremely harmful, as this mixture, over a period of time, strips all the protection from the metal surface.

Use of oils such as MIL-L-7808C is also quite harmful to painted surfaces as it has a diester base. Use of these mixtures could be causing the condition that results in corrosion. All aircraft should be cleaned per NavAer 07-1-503, "Material Used on Naval Aircraft in Cleaning, Stripping, and Polishing Operations." The recommended cleaner for painted aluminum surfaces is Mil-C-18687 Aer Type 2.—*Douglas Aircraft Co., Disp. 12-12-58.*

UNFORTUNATE COMBINATION

The port side of this HSS-1 had been jacked for a main landing gear change. A combination of wind gusts (hangar doors open) and an unseated tail wheel locking pin caused it to topple. The preventive measures should be obvious.

INSPECTION — An R4D-7 experienced port-engine fire in climb to VFR on-top flight altitude following departure from its home base. Sections of the port engine exhaust collector separated, allowing exhaust flame to escape within the engine housing.

A mechanic had failed to secure properly the exhaust clamp assembly around a telescopic joint of the exhaust collector ring. Vibration apparently caused the clamp to slip, permitting the joint to separate slightly, thus allowing the exhaust flame to escape into the engine nacelle.

Quality of workmanship and closer supervision of maintenance work and more rigid post-maintenance inspection is now required by the reporting unit.

GROUND ACCIDENTS — The continued trend in ground accidents has reached the level that command attention has been directed to reduce this type accident to the minimum possible. Suggested means of reducing this type series of accidents are:

a. Maintenance of equipment

b. Selection of competent drivers and/or operators

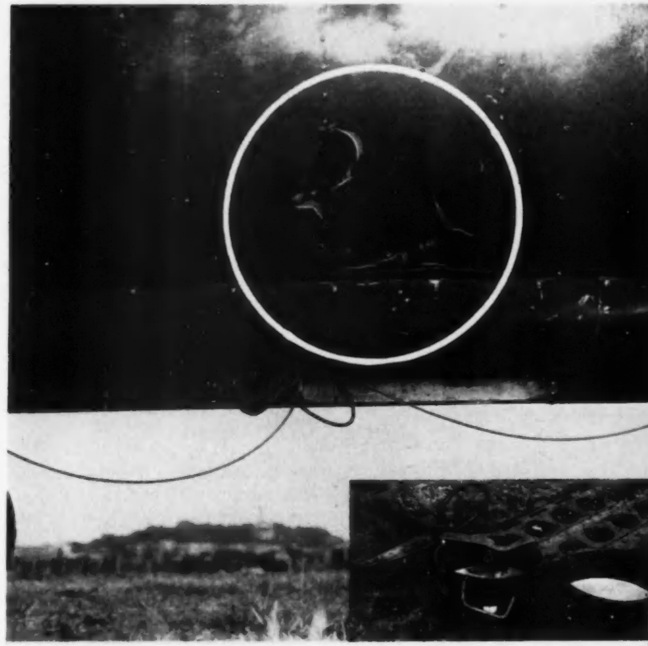
c. Adequate training

d. Positive supervision in order to assure safe accident free operations.

MISMATCHED COUPLINGS—Shortly after takeoff in an F3H-2, the pilot experienced complete loss of utility hydraulic pressure. He returned to the base and extended landing gear and slats by emergency means. The tail hook was dropped and a normal landing was made, engaging the field arresting gear.

The pressure loss was caused by the installation of part no. A145-S2-16D (1000 psi hydraulic quick-disconnect fitting) in place of part TA155-S2-16D (3000 psi fitting). Highly inflammable hydraulic fluid was splashed throughout an area adjacent to the air intake ducts. Leakage of the ducts could have allowed this fluid to be sucked into the compressor section, possibly resulting in fire.

While these parts to most appearances are interchangeable, they definitely are NOT interchangeable due to internal design differences. It is imperative that persons ordering and installing these components be sure of proper part numbers. Proper assembly and component numbers are included in Accessory Bulletin 9-54.



Brake bleeder, lower right, exploded when it was pressurized with high pressure air. Note damage to fuselage of helicopter circled above.

BLEWEE!—Line maintenance personnel servicing aircraft attempted to charge a Linco Brake Bleeder with a high pressure air bowser. The brake bleeder exploded stunning 3 men and damaged the fuselage of a helicopter; see photo above.

Operating pressure for this Brake Bleeder is 15 psi, and should be charged by hand air pump. Subsequent investigation revealed one operative hand pump for 120 aircraft.

Indications and evidence that overcharging brake bleeders has been practice rather than exception. Corrective action:

► Hand air pumps be acquired by open purchase immediately.

► Intensification of safety program in line maintenance and shop areas.

Occurrence: T2V-1

Maintenance personnel were checking a T2V-1 for cabin pressurization. One man was in the cockpit, canopy closed and locked, during the turn-up, while the other was feeling for leaks in the canopy air seal outside of the cockpit. The handle on the pressurization control unit in the nose sec-

Continued from preceding page

tion was in the normal position so that pressurization was slight in the cockpit (0.5 psi at most).

The man in the cockpit reduced power to idle, actuated the pressurization dump valve switch and unlocked the canopy. Immediately upon being unlocked, the canopy blew open far enough to break the canopy actuating clamp assembly, allowing the canopy actuating arm to pull free of the actuating jack screw. This in turn permitted the canopy to drop to the sills. As the canopy blew open, the right hand of the man outside the cockpit slipped off the canopy and onto the canopy sill. When the canopy dropped, it struck the first, second, and third fingers of the right hand, incurring multiple fractures and mangling the tips of said fingers.

Corrective Action:

The cockpit pressurization system components were closely examined and the aircraft turned up in an effort to safely duplicate the occurrence. The results of these tests and examinations revealed a malfunction of the dump valve solenoid. Although normal time for depressurization is approximately seven seconds, repeated tests conducted by dumping the pressure and immediately actuating the canopy lock lever, sufficient pressurization could not be retained in the cockpit to cause the canopy to react as it had when the accident occurred.

It was concluded that the cause of the occurrence was a momentary malfunction of the cockpit pressurization dump valve solenoid permitting the valve to remain closed retaining pressure in the cockpit which forced the canopy open.

All personnel have been instructed to stay clear of canopies during actuation. Also to allow more time to elapse between dumping the pressure and unlocking the canopy locking lever.

It is recommended that all activities utilizing the T2V aircraft disseminate the above information to their personnel in an effort to preclude recurrence of similar incidents and thereby further promote their ground safety program.

Occurrence: FJ-4B

A forced landing of an FJ-4B aircraft was caused by the fuel control going to idle due to lock nut Part No. AN 363-428 backing off from power lever connecting bolt Part No. 194-42023 and allowing the bolt to drop out.

Recommendations:

Activities are advised that all lock nuts used in the engine control system are to be used only once as outlined in last paragraph of BuAer msg 232010Z October 1958. *Please see Flight No. 3, Page 40.*

Occurrence: P2V-7

While flying at an altitude of 3000 feet at an airspeed of 200 knots, severe buffeting of the P2V-7 was suddenly encountered. Investigation disclosed that the Mk. 12 life raft, located in the port wing was inflated and had forced the compartment door to the vertical position. Throttle settings were increased on all four engines to maintain 160 knots.

The first mechanic was instructed to jettison the life raft with the cockpit life raft release, but the attempt to jettison the raft was unsuccessful. The ordnanceman was then instructed to jettison with the after station release handle, but this action also failed to release the raft. Approximately five minutes later the raft carried away and immediately thereafter a normal landing was safely executed. The raft was recovered and found to be damaged beyond repair. The inflation bottle and all raft accessories were lost.

Investigation of the mechanical and electrical life raft releasing mechanisms disclosed that the release system had been operated electrically; the ejector control cylinder had been discharged. Actuation of this cylinder is accomplished by the control head solenoid. Further examination of the electrical release system revealed the following:

a. The life raft submersion actuator (Part No. R4210-497-6288-g329) showed evidence of slight internal corrosion.

b. The 12 volt solenoid actuated switch (Part No. R5945-602-6801-D334), although still operable, showed evidence of severe overheat.

c. The remainder of the electrical circuitry appeared intact and fully operative.

The pilot of the aircraft stated that approximately 10 minutes prior to release of the life raft, the aircraft had flown through a heavy thunderstorm and had encountered moderate turbulence. Although results of this investigation are inconclusive as to cause, it is presumed that electrical release was initiated by the submersion actuator.

Corrective Action:

Action has been taken to replace the 12-volt solenoid switch and the life raft submersion actuator, and to inspect the submersion actuator at frequent intervals for evidence of internal corrosion.

In consideration of safety of flight, it was recommended that the contractor be requested to conduct a study of the electrical release system for a possible fix to preclude inadvertent operation of the system.

Right: On turn-up following an oleo strut change, the starboard gear collapsed.

Below: Cross-connected hydraulic lines brought maintenance short cut to light.

MURPHY'S LAW*

THE port engine of this S2F-1 was being started in a normal manner. As the engine caught on prime, the starboard main landing gear began to collapse slowly. The engine was immediately cut and the aircraft, with the starboard gear continuing to collapse, came to rest on the starboard gear barrier engaging hook, one blade of the starboard propeller and the two remaining landing gears which were locked down.

A new oleo drag strut had been installed on port main landing gear. After work was completed on the drag strut the up and down hydraulic lines to the starboard main landing gear were disconnected at the cylinder in order to drop check only the port gear.

Upon completion of the drop check, the hydraulic lines to the starboard gear were replaced cross-connected. Starting the engine caused pressure to go through the down line to the up side of the cylinder, unlocking and retracting the gear.

This exercise of Murphy's Law is considered to be a supervisory error and was in violation of BuAer TO 2-48 which requires a functional test of any hydraulic component which has been disconnected. All hands who might become involved in the servicing of landing gear should be thoroughly briefed in the provisions of TO 2-48.

* If an airplane part can be installed incorrectly, someone will install it that way!

Clipboard

R3350 Overboost Rule

WE ARE now operating under a new directive concerning the action to be taken with our beloved 3350 when an overboost occurs. Continue to report all overboosts as before. The difference now is that an overboost of 4 inches for 5 seconds is an automatic engine change. Let's take good care of our iron birds. Be smooth and gentle. —Ref. BuAer Speedletter (Aer-PP-23/14 dated 1 Dec 1958, "Overboost Limitations for Reciprocating Engines." — *ATU 301 "Chock Talks"*

Climbs and Descents in Air Traffic Control

Presently, aircraft may descend at an unrestricted rate to an altitude 1000 feet above the assigned level. The last thousand feet of descent to the final assigned altitude is to be at a rate not in excess of 500 feet per minute. The same philosophy also applies to climb procedures.

In many cases, during departures when aircraft are being laddered to altitude, it is normal practice to merely level off and permit the airspeed to increase. When the next altitude assignment is received, and because of this increased airspeed, many of our present aircraft will then climb at a very rapid rate. Should this rapid rate of climb be made to an altitude vacated by an aircraft with considerably less performance, it is quite possible that standard vertical separation criteria is not maintained. Therefore, it is suggested when receiving altitudes in 1000-foot increments, that the climb be held to a rate of 500 fpm. When you are receiving higher altitude clearances in 1000-foot increments, you may correctly assume that this form of laddering is being accomplished solely because there is an additional aircraft at the next altitude above you. When you consider that the altimeter normally lags quite a bit behind the aircraft during a very rapid rate of climb, it is fairly easy to visualize how it is possible to inadvertently enter the same altitude occupied by the other aircraft.—*Capt. J. D. Smith, Chairman of the Air Traffic Control Comm. in ALPA "Technical Talk for Pilots" 11-24-58.*

Answers to WHIZ QUIZ Page 23

1. Yes indeed, if you are attached or assigned to his command and he has authority to issue an instrument ticket, he can lift yours. OpNavInst 3720.2A, IV, 9.

2. The container says they're to relieve fatigue and help you stay awake—but use them ONLY in an emergency survival situation on the ground, where falling asleep might be a real danger.

3. No, NOTAM interchange isn't quite that universal or unified—best to ask Ops to check with Flight Service.

4. According to OpNavInst 3750.6C it would be an aircraft accident, requiring the submission of an AAR, because there was intent for flight and damage greater than LIMITED was sustained.

5. You can find this answer in OpNavInst 3750.6C also; paragraph 65. It's not a security classification as such, it's intended to prevent the use of an accident prevention document (the AAR) as a legal instrument.

6. Two g and 60 degrees are the limits published in BuAer Inst 3710.6—but there are other criteria too—better read it.

Brain Storm

RECENTLY each unit of the 2nd MAW was requested to give its Safety Committee any idea of policy that aids in the safety education program and the prevention of aircraft accidents in their respective unit. The following topics were presented.

a. Signs in readyroom and line shack to indicate the number of accident-free hours flown.

b. All pilots meeting each morning for the dissemination of information.

c. Publishing of a monthly magazine within the Group.

d. Designate a vehicle driver who will remain at the controls at all times while the engine is in operation.

e. Report sightings of foreign objects on runway and taxiiways.

f. Do not permit personnel to ride on wings while aircraft's either being towed or taxiied.

g. Have wing watchers, on both sides of aircraft being towed or taxied in congested areas.

h. Call Flight Service for check on NOTAM when going into an Air Force or civilian airport.

i. Read and initial folder information put on a route sheet to ensure that all pilots read.

j. Weekly quiz program on aircraft and its systems.

k. Ensure that all pilots properly fill out discrepancies on yellow sheet and that maintenance properly writes them off.

l. Abolish the term "ground check OK."

m. When removing parts from an aircraft that is down, ensure that it is tagged.

n. Install long jet starting lead cords on all NC-5s.

o. Do not back NC-5 towards an aircraft.

p. Do not taxi fast nor in formation.

Which of these would aid your unit?

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WELL DONE!

P. J. KERTESZ, AMSAN

and

J. J. ESTOK, AMSAN

During night flight operations at NARTU, NAS Lakehurst, Estok and Kertesz were assisting a plane captain of HU-751. After the HTL had launched and the men were headed back to the line shack with a tractor, they noted a fan belt lying on the mat. They immediately contacted the plane captain of the helicopter just launched and learned that he had checked both fan belts with the pilots prior to turnup. The two men then went to a nearby HTL which was also turning up and, finding both its fan belts intact, asked the pilot to recall the other HTL as a precaution.

Upon its return, it was discovered that the first HTL had lost one of its fan belts, presumably during starting or takeoff.

The HTL has two fan belts which are essential for engine cooling. Normally the loss or absence of one belt is rapidly followed by loss of the other; and loss of both belts will result in engine seizure from overheating in just about four minutes!

To M. J. Estok and P. J. Kertesz, a hearty WELL DONE for their headwork and for taking the time to follow a clue to a safe conclusion . . . it would have been so easy to pick up the belt and deposit it in a trash can . . .

NO TIME FOR STUDY — page 3

You're cruising along, fat, smart and happy, and suddenly find that YOU'RE the on-scene boss of a sea search for a downed aircraft — a complex, demanding job is upon you quickly. There's no time for a trip to the library to review sound procedures — in short, there's No Time For Study . . . . .

BURNER BANGER — page 14

Some folks will use any excuse to fire a flare — in this case the flare triggered off a series of events which left this Anymouse somewhat shook. What would you do if you had just touched down in an F-11 and the sky lit up with flares, and the tower told you to "take it around"?

POCKET THAT ROCKET — page 12

Like we said, some folks will use any excuse to fire a flare, and some can't wait for the right time to use one. There is a right time, and it's NOT while dangling from a parachute. Signaling too early can have disastrous results for the signaler.

SAD SACK — page 20

Remember the *Connie* that tilted aft when its tail became loaded with wet snow last year? Here's an even bigger victim — a poopy bag, hitched outside the barn, picks up a monstrous load of snow, can't shake it off, gasps and expires.

EXPOSURE TO RADAR WAVES — page 26

Back in the earlier days it used to be great sport to push someone into a radar beam — especially if he had heard scuttlebutt and old wives' tales about the consequences. Though today's tremendously powerful radar sets are capable of doing harm, more is known of their effects.

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